FOOD MANUFACTURE

Incorporating Food Industries Weekly

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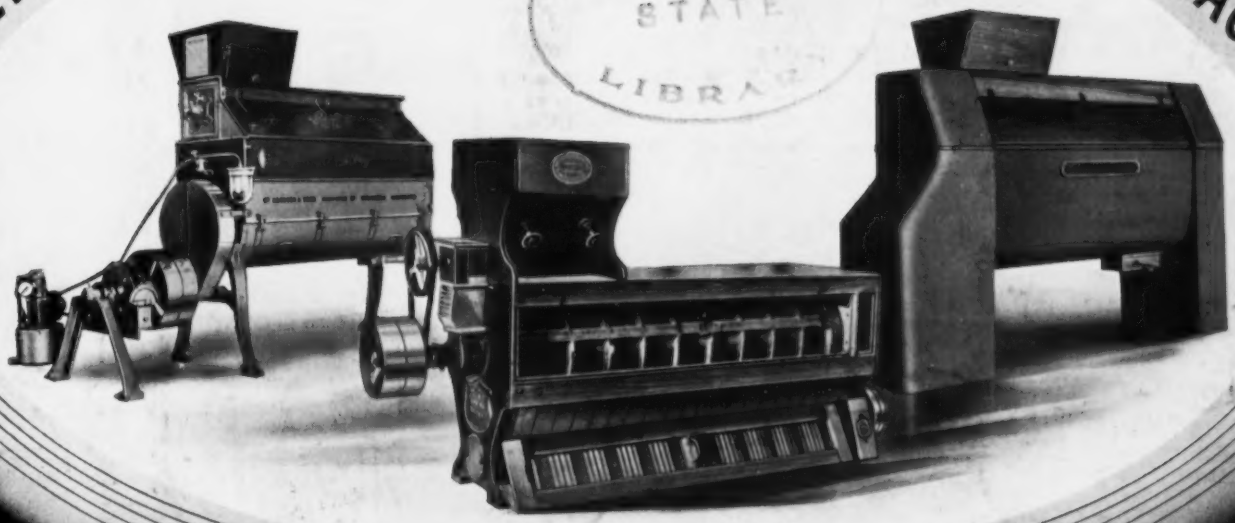

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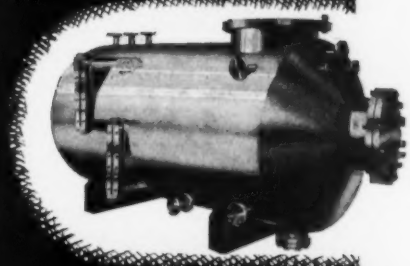

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FOOD MANUFACTURE

VOLUME XVI. No. 9 SEPTEMBER 1, 1941

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The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

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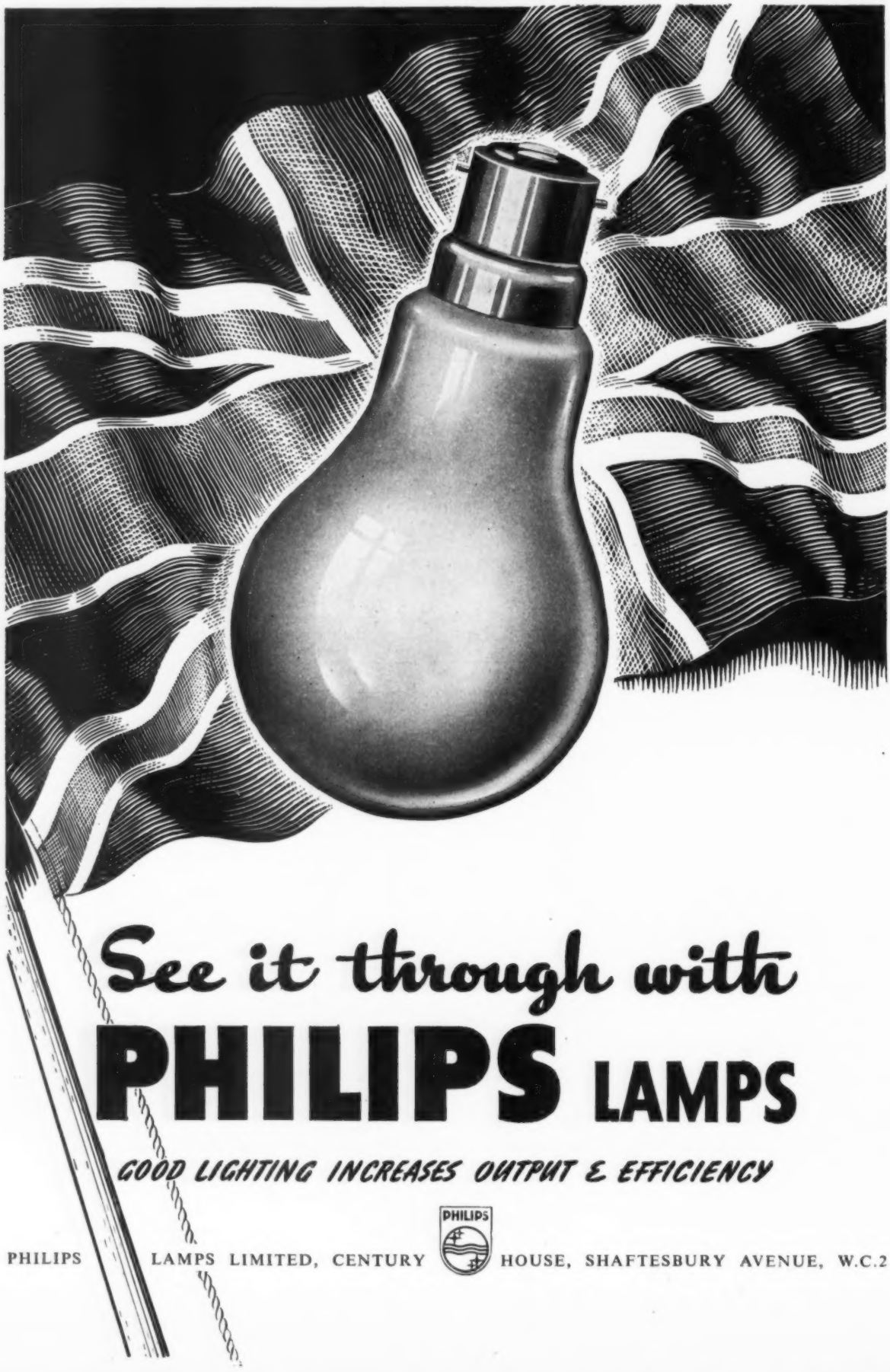
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FOOD MANUFACTURE

Vol. XVI, No. 9 September 1, 1941

British Creameries

THE POSITION of all creameries in England and Wales —they number more than 500—will be stabilised for the duration of war by a decision reached by the Milk Marketing Board.

Some creameries are licensed for the manufacture of butter, cream and other milk products that do not receive priority under the Ministry of Food's manufacturing programme. Proprietors of these factories have been anxious to know whether the enforced idleness of their plants, either wholly or in part, would affect their licences. The Board have now decided that approval of premises licensed by them at the date of the Milk Marketing Board (Modification of Functions) Order, 1940 (*i.e.*, September 25, 1940), will not be withdrawn during the war merely on the ground that, in consequence of decisions made by the Ministry of Food regarding the utilisation of milk, such premises are not used for the purposes for which they are licensed.

Another decision reached by the Board in regard to creameries is to waive, in certain circumstances, the surcharge of ½d. per gallon on milk manufactured in towns of more than 60,000 population.

Milk manufacturers have been pressing for the abolition of this surcharge from the early days of the marketing scheme on the ground that the total costs of manufacture were no lower in such towns than in country districts; but the Board argued that town creameries were in a favoured position by having a market "on their doorsteps". Creamery proprietors maintain that under present conditions there can be no such advantage, as the Ministry of Food purchases all manufactured milk products at uniform prices irrespective of whether they are produced in town or country factories. Manufacturers have stressed this point for more than a year, and the Board have now agreed to waive the surcharge in all cases where milk is used in the manufacture of hard cheese with the Board's consent. The waivure is to be made retrospective from April 1 last.

Bed-rock Diets

We can still give up very much of our accustomed diet and live, if we should have to do so, on very simple kinds of food without detriment to our health.

To what extent this may be possible is suggested by Sir Leonard Hill in a recent letter to *The Times*. Millions in Russia (he says) live on black bread and cabbage soup. They could not live on white bread or on the "fortified" white bread of the Ministry of Food. Millions in Thibet and Sinkiang live on parched barley and buttered tea. In the cold climate of Thibet the monks may drink fifty cups of tea in a day. Rickshaw runners in Japan can cover fifty miles in a day on a diet of rice, salads, and a little fish. In Denmark during the last war a diet of potatoes and milk sufficed for all day bicycling, and men lived healthily on this for more than a year. The west coast peasants of Ireland live on potatoes, maize-meal bannocks, and a very little milk, eggs, or fish. In Scotland, oatmeal, kale, and some fish have raised a strong race.

In view of the relatively copious supplies of such products as lentils, peas, beans, it is just a little pathetic to see long queues of people waiting to buy "brawn"—sometimes a highly coloured product with the minimum meat content. Stress might be laid by the Ministry on the value of sprouted peas and beans, although it is admittedly difficult to steer people from their accustomed food habits.

Lord Dawson's Views

Speaking in the House of Lords, Lord Dawson, stressing the necessity for milk, eggs, and cheese in relation to the preparation of other dishes, said that tired people and tired stomachs needed light and attractive dishes for preserving them in full health and strength. The Minister of Food should insist on such a production of milk as would ensure no serious curtailment in the supply available for the population. There was also a need for more eggs to be made available. He was glad (he said) to observe the improved cheese position and to know of the actual and prospective store of dried and preserved milk.

We are, fortunately, a long way from having to live on the parched barley and buttered tea of Thibet, but our people might with advantage be made conscious of how fortunate they actually are and what possibilities there exist for survival on a much more straitened diet, as suggested by Sir Leonard Hill.

Speeding up Food Control

In a letter to *The Times*, Colonel G. R. Harding stresses the vital need for speed in decision in connection with food matters in the Ministry. He suggests that the organisation has become too complex, and its simplification would result in greater efficiency and economy of overhead charges. He points out that it would accelerate decisions if the heads of departments were in London. Pointing out that for well over six months the public have waited patiently for effective action to stop food profiteering, he says that the remedies are simple enough, and have been enunciated frequently. They are that: (1) All foodstuffs for sale should be clearly marked with price tickets. (2) Maximum price orders should be introduced without the delay which present cumbersome procedure makes inevitable. (3) *Bona fide* manufacturers, wholesalers and retailers should be licensed with the proviso that such licenses would be ruthlessly withdrawn by the Ministry in cases of profiteering or serious breach of regulations.

Shredded Suet Prosecution

Another example of the lamentable state of our food laws is offered by a recent prosecution of some suppliers of shredded beef suet which contained 22 per cent. of added rice flour. The borough analyst stated in his evidence that the reasonable maximum, in his opinion, was 15 per cent., and he based that on a large number of analyses he had made of samples over a period of twenty years. The average he found was 12 per cent.

A city analyst said that in his opinion 15 per cent. of added rice flour should be the maximum, the average of 95 per cent. of the samples he had taken during the last twelve years being 12·9 per cent.

Here is a case where there is evidently no ruling on the subject, and the matter relies on custom. It would save a lot of time and money and manufacturers a good many headaches if there were a fixed specification for shredded beef suet and similar articles.

Apart from this, there seems recently to be a tendency for the defendants in food prosecutions, as in this case, to put up a plea of temporary abandonment of proper precautions, and we strongly feel that such defence should never be admitted.

Will War-time Cold Stores be Scrapped?

Our esteemed contemporary *Modern Refrigeration* seems to be perturbed when writing: "What the Government will do after this war with the large cold stores which it is adding to the industry's establishments we cannot say. The solid character of their structure would seem to remove any thought of their being scrapped. . . ."

The construction of temporary stores has repeatedly been advocated, but the term "temporary" has never been defined nor has the type of construction of insulated rooms which, though of a temporary nature, would keep our valuable food reserves in good condition and not liable to rapid destruction by fire.

We are informed that the new cold stores "are being built in or near to the consuming centres, right where the population exists and will need the food", and that "the new and large capacity stores now being erected by the Government are all modern first-class jobs". This is good news; the right kind of store in the right place. So why be perturbed? Why this talk about scrapping these stores after the war? Why should modern first-class jobs be scrapped and the nation's foodstuffs stored after the war in cold stores which on survey have been found to be unsuitable for the proper preservation of perishable supplies?

Is there going to be too much cold storage space after the war? Perhaps too much space of a kind, but not too much modern space. After the war will be the time for progressive firms to take over these well-located first-class jobs and let the owners of musty and mouldy stores ruminate on the meaning of progress and efficiency.

We wonder whether other trades are similarly perturbed over the construction of new factories, new plant or certain war material. One might well ask what is going to happen to the surplus number of tanks at the end of the war? Are the makers of agricultural implements raising objections to tank construction on the grounds that light tanks may be converted into tractors after the war? Are engineering firms objecting to the construction of heavy tanks which may after the war be converted into excavators and movable crane carriers?

What are we going to do with our barrage balloons? Possibly use the material for motor car dust covers, packing material, stall covers and umbrellas. Somebody with brains will find use for any surplus, especially for new buildings and plant, including cold stores.

Sweets from Cereals

A German source provides the following recipe, giving the product a pseudo-Hungarian name and alleging that it is made by Hungarian peasants. We have been unable to confirm the Hungarian origin, but it appears something like an extract of malted wheat which is made in parts of Russia. We give the recipe for what it is worth and without comment:

"Take equal amounts of wheat and rye grain; clean and wash the grains. Place the mixture on a shelf in a warm place and keep moist. After four to eight days the sprouts should be ½ to 1 in. long. The whole mass is ground up and is extracted with water. Flour is added to the syrupy extract, only enough being added to retain the liquidity of the mixture. The liquid mixture is baked in an earthenware vessel, and assumes the consistency of fruit compote." The finished product is said to be light brown in colour, to flow like thick honey, and to be very sweet.

Synthesis of Fat by Moulds

Synthesis of fat by moulds has been further studied by S. Suzuki. The first of a series of papers on the fat metabolism of the mould fungi has appeared in the *Journal of the Agricultural Chemical Society of Japan*, Vol. 17, 1941, pp. 300-306. *Endomyces vernalis* and other well-known fat-forming fungi are mentioned, but the paper has special reference to *Pencillium javanicum*.

Wheat Storage

Research undertaken recently on the effect of low temperatures in preventing damage to wheat stored with high moisture content is the subject of a note in *Modern Refrigeration*, July, 1941. The wheat was stored at various moisture contents and at 41° F., and during the second year variations in air supply and duration of time were introduced. The main tests were viability, soundness of grain, and milling and baking results.

There was no decrease in viability in the samples stored in the cold, while all those stored at higher moistures in the laboratory were dead. Wheat of good viability shows no damage to its milling and baking qualities. Unsoundness, as indicated by mustiness, developed at lower moistures in the laboratory than in cold storage. In the latter, sourness developed in the samples with the higher moistures.

This kind of damage was not reflected in the results of the baking tests. In fact, these tests were shown to be much less capable of detecting damage than the viability and the odour tests. The altered cure characteristics obtained on the damaged samples were not due to changes in the ether extractable substances, but to alteration in gluten characteristics.

Wheat, it has thus been proved, may be stored at 41° F. at high moisture for many months without suffering any damage to its milling and baking qualities. When wheat has good viability it has suffered no damage to the gluten structure even when a slight odour indicating unsoundness can be detected.

The Relative Sweetness of Sugars

A study by A. C. Dahlberg and E. S. Penczek undertaken to evaluate organoleptically the relative sweetness of several sugars when compared with sucrose solutions varying from 2 to 50 per cent. taken as standards for comparison is described in Technical Bulletin 258 of the New York State Agricultural Experiment Station. The different sugar solutions were matched to find the percentage concentrations that gave sweetnesses identical with the sucrose solutions used as standards. It had been previously noted that dextrose was relatively less sweet in chocolate milk than in ice cream.

The relative sweetness of levulose, beta-lactose, maltose, dextrose, and corn syrups, using sucrose solutions as standards, varied directly with the concentration. The relative sweetness of these sugars, except levulose, was nearly twice as great in high concentration as in low concentrations. The relative sweetness of beta-lactose and maltose varied from 33 to 60 per cent., dextrose from 62 to 100 per cent., high conversion corn syrup from 40 to 80 per cent., and ordinary corn syrup from 28 to 54 per cent.

The relative sweetness of sugars bore a log-log relationship to sucrose, the standard for comparison. When R was the relative sweetness and S the percentage concentration of sucrose used as the standard for comparison, the relative sweetness of the corn sweeteners was expressed by the parabolic equation $R = 37{\cdot}097\ S^{\cdot 26365}$, and the relative sweetness for all the sugars studied, omitting levulose, was expressed by the parabolic equation $R = 32{\cdot}598\ S^{\cdot 22693}$.

The percentage error in the data due to the limit of accuracy in tasting varied from 2·5 to 4·0. This represented from 0·07 to 2·0 per cent. sucrose, and this variation increased with increased concentration. The least percentage error was secured at 10 and 20 per cent. sucrose where differences of 0·25 and 0·50 per cent. respectively of sucrose were detected.

A significant supplementary effect of dextrose and corn syrups in sucrose solutions was found. This effect was sufficient to give both dextrose and high conversion corn syrups the same sweetness as sucrose in 25 per cent. solutions. Ordinary corn syrup was as sweet as sucrose in 40 per cent. sucrose concentrations.

Gulls' Eggs for Food

In view of the article on gulls' eggs which was published in FOOD MANUFACTURE (February, 1941), it was interesting to read of an experiment in Wales described by a correspondent of *The Times*, August 5. He writes:

"A few months ago Lord Davies decided to arrange a collection of gulls' eggs from an island in a lake on his estate in Montgomeryshire, the twofold object being to ascertain the food value of these eggs and to augment the limited supplies of domestic eggs available.

The experiment was entirely successful and some 15,000 eggs were obtained during the laying season of about two months up to the middle of June. Gulls' eggs do not appear to be controlled, and a large number of the eggs collected were sold at reasonable prices in the Llandinam district and elsewhere and the remainder were given away to estate employees and others.

The eggs, which were collected twice weekly, were found to be very nutritious and wholesome—a fact which may not be generally known. There are surely many other parts of the country in which gulls abound and from where a considerable number of eggs might be obtained annually. Therefore, in order to some extent to assist the authorities in the Food Control, it is suggested that arrangements be made for the collection of these birds' eggs on as large a scale as possible during each laying season for at least the period of the present war."

The Future of the Milk Supply

The general shortage and rationing of the more important foodstuffs has inevitably increased the demand for the more valuable foods, with the result that the consumption of milk has greatly increased. It is not surprising that, as the result in the shortage of important feeding stuffs, the total milk yield may be expected to be down. The extent to which it will be down this coming winter will depend mainly on how far the home farmer succeeds in making good the lack of imported concentrates by home-grown roots and cereals, and of the hay and silage crop. The success of the Ministry of Agriculture's "ploughing-up" campaign is, therefore, a matter of concern for every milk consumer. The fact that householders have been asked to register with one milk retailer does not necessarily imply that rationing is inevitable. Neither will the institution of rationing necessarily mean that an acute shortage is anticipated. The primary purpose of rationing is to ensure a fair distribution. There is little doubt that, at the present time, the better-off section of the community is getting a comparatively liberal share of the total available milk, while the poorer section, especially the children in large families, are getting an inadequate amount. It is important, therefore, for the authorities to ensure that each person gets, as far as possible, an adequate supply of milk. If rationing is the only way of ensuring this proper distribution, new milk should be rationed.

Aroma-Producing Substances in Butter and Bread

A review of methods of determining methylacetyl carbinol and diacetyl and some discussion of the *rôles* played by these substances in producing aroma has been contributed by T. Jenö to No. 2 of *Mezögazdasági Kutatások* (Vol. 14, 1941, pp. 47-65; in Hungarian, with German summary). He also includes a brief review of legislation in various countries relating to diacetyl, and concludes by giving an account of his own investigations into the *rôle* and determination of aroma-producing substances in butter and bread, and into the changes of their amount on storage.

Thus in bread the original amount of the substances is alleged not to change as staleness supervenes. With butter, however, the changes in amount of aroma-producing substances are less easy to summarise. Although the only sets of figures given by the author show progressive decreases in the amounts of both diacetyl and carbinol on storage for periods of up to sixty days, it is stated that the amounts may increase or decrease, depending upon whether the butter was made from sweet or sour cream, and also depending upon the temperature of storage.

Butter having a high content of diacetyl is always aromatic, but there are butters with marked odour in which the diacetyl content is low. About 80 to 90 per cent. of the diacetyl content of Hungarian bread is concentrated in the crust, and the odour is no indication of the degree of freshness.

Determination of Diacetyl

As the determination of diacetyl is a matter of some difficulty, the author has sought for a ketone reagent which would obviate the necessity of constantly preparing fresh solutions. He has investigated the use of alkaline dicyanodiamide as the basis of a colorimetric method; for standards he has proposed a set of faintly acid mixtures of methyl orange and methyl red, which keep indefinitely. The colour developed by diacetyl in presence of alkaline dicyanodiamide tends to deepen on standing, so that the reading should be made a standard short time after the reagent has been added. While the dicyanodiamide method has promise, it appears that further work on standardising it will be necessary before it can be relied upon. The author offers no suggestion regarding any correction factor, and, indeed, concludes that the dicyanodiamide method can never be satisfactory. It seems that this may be an unduly pessimistic view.

Kitchen Waste Buried

A surprising development has followed the agitation to increase the collection of waste food, stated the *Farmer and Stock-Breeder*, July 29. In certain areas local authorities have started schemes but have been unable to dispose of all the food, with the result that some of it has had to be buried.

The Waste Food Board (which was set up as a branch of the Salvage Department of the Ministry of Supply in May) is said to have been "somewhat dumbfounded" to find that in Newcastle, Leicestershire, Northants, and Surrey difficulty is reported in getting feeders to accept raw kitchen waste, with the result stated. It would be interesting to know the reason for this, as surely there must be one.

However, feeders in general speak highly of the results secured from kitchen waste. In June the amount of kitchen waste collected by local authorities and sold to feeders was 13,000 tons. Most of this was sold in the raw state. In addition, local authorities collected sufficient to feed their own pigs numbering about 10,000.

Plants for concentrating waste food are now in operation at Tottenham, East Ham, Nottingham, Bolton, Stoke, Nelson, Newcastle, Preston, Wolverhampton, Brighton, Woolwich, Birkenhead, Sheffield and Leeds.

Other plants will be running in a few weeks' time at Middlesbrough, Oxford, Derby, Bristol, Norwich, Luton, Southend and Plymouth.

Camberwell, Westminster and Reading have plants under consideration.

Decomposition of Vitamins

W. E. Parker and his co-workers (*Canad. J. Res.*, 1941, 19A, 17) have found that the decomposition of vitamin A in halibut liver oil under the action of ultra-violet light is retarded by the anti-oxidant effect of adding wheat germ oil. The effect of ultra-violet light in destroying some vitamins has been noted by H. Schroeder (*Münch. med. Wochschr.* **86**, 821), who finds that irradiating milk for ten minutes with light from a quartz-mercury lamp causes a 50 per cent. decrease in the vitamin C content which was entirely destroyed by one hour's irradiation.

THE ECONOMIC UTILISATION OF WHEAT

A WAR-TIME PROBLEM

In this useful contribution to a much-discussed subject the author gives his views on the problem of economy in the utilisation of wheat supplies and, in doing so, presents a brief but apposite survey of the aims and principles of the milling process.

A. J. AMOS, Ph.D., B.Sc., F.I.C.

THE MAINTENANCE of adequate supplies of the basic foods of the average diet of this country, and of many others, is contingent upon the continued availability of ample quantities of wheat. This cereal is not only the source of the staple food of the country—bread—but it also provides, as by-products in the manufacture of flour, important quantities of valuable animal feeding stuffs. Thus, it supplies the nation with food directly in the form of bread and also indirectly by aiding the maintenance of an adequate supply of milk, meat and eggs. The annual home-grown wheat crop is, however, comparatively small and we are obliged to rely upon importations for about 80 per cent. of our total wheat requirements. This necessity of importing considerable quantities of foreign wheat presents no difficulties under peace-time conditions, but the fact that all our imported wheat must be sea-borne is naturally a serious disadvantage at a time like the present when our sea lines are under attack and liable to suffer disorganisation. It is obvious that under such circumstances there is a very real need for utilising in the most economical manner those wheat supplies which become available to us.

Wheat as Food for Livestock

The problem is, of course, complicated by the fact that wheat serves as a source of food for livestock as well as for humans, and we cannot afford to ignore the needs of the former as they contribute to our diet both vitamins and protein of high biological value. Obviously, however, the first call upon our wheat must be the provision of an adequate supply of attractive and palatable bread, since this cheap and popular carbohydrate food of high calorific value is well suited to constitute the basis of a war-time diet. It is important, however, that this policy of utilising wheat in the form of bread should not be so pursued that sight is lost of the necessity of maintaining, as far as possible, the supply of animal feeding stuffs at a level which will prevent a serious shortage of milk or other important animal products.

The proper appreciation of these and other facets of the problem demands that the aims and elementary principles of the milling process should be understood, and an attempt will, therefore, be made to present a brief but apposite survey of this subject before the main problem is examined in greater detail.

Composition of Wheat

The wheat grain consists of three main parts: the germ or embryo, the endosperm, and the outer skins or husk which constitute the protective envelope of the grain. These parts are present in the following approximate relative proportions: endosperm 85 per cent., embryo 2 per cent., husk or skins 13 per cent.

The aim of the modern milling process is to produce white flour for human consumption by removing as much as possible of the endosperm in a state of comparative freedom from powdered-up husk, and to leave as a residue suitable for animal feeding a material containing the majority of the husk and germ. If it were possible to make the separation perfectly, every 100 parts of wheat milled would yield 85 parts of endosperm or flour and 15 parts of wheatfeed made up of 13 parts of husk and 2 parts of germ. Such a degree of efficiency is, of course, quite impracticable. Firstly, it is impossible to scrape off from the branny skins all the adhering endosperm, while, secondly, a stage is always reached eventually where the stock being dealt with consists of endosperm admixed with ground-up bran in a similar state of division, so that it is no longer possible to separate the endosperm in a state of sufficient purity to permit its inclusion in the flour.

The amount of white flour produced from 100 parts of wheat under normal peace-time conditions is in the region of 70 to 72 parts, or, in other words, the average flour extraction is 70 to 72 per cent. This is rather more than 80 per cent. of the maximum yield possible theoretically.

Not only is it impossible to separate all the endosperm from the wheat but it is also impossible to avoid the presence in the endosperm which is separated of some finely ground-up husks, or, in other words, bran powder. The extent of such contamination depends upon the extraction of the flour in question; the greater the extraction the higher the bran powder content and hence the darker the colour. This explains why, as the proportion of flour obtained from a given quantity of wheat is increased, the flour originally obtained gives place to brown flour and eventually, of course, to meal. The general public, however, has a decided preference for white bread, and this is the main reason for the general adoption under normal circumstances of an extraction of 70 to 72 per cent. Millers have found that this is the extraction which furnishes a flour conforming to the standard demanded by the public.

Flour Extraction

As the present crisis developed and it became increasingly necessary that every possible step should be taken to conserve our food supplies, attention naturally turned to the question of flour extraction. The suggestion was put forward from a number of quarters that white flour should be prohibited and the conversion of all wheat into wholemeal made compulsory.

Wholemeal is, of course, essentially finely ground whole wheat and includes, therefore, those portions which, in the manufacture of white flour, are separated for animal feeding purposes. The adoption of such a policy would, of course, ensure the production of the maximum amount of flour—or rather meal—from a given quantity of wheat and, on the face of it, therefore, appears to be the solution to the problem of how the wheat supply could be utilised most economically. Adequate nutrition is not, however, assured solely by the provision of foodstuff in sufficient quantity to meet the demands of normal consumption. It is essential that the foodstuffs available should meet all the dietary requirements and also should be sufficiently attractive and palatable to ensure their continued consumption in adequate amounts. Before, therefore, the value of the suggestion to raise the extraction to essentially 100 per cent. can be properly assessed, account must be taken of the possible reaction of such a step upon bread consumption, while against the nutritional advantages derived from such a move must be balanced the loss of nutrients occasioned by the resulting reduction in animal feeding stuffs.

Wholemeal Bread

Now wholemeal bread has never gained any significant popularity in this country despite its being readily obtainable. It is true that the quantity of wholemeal and other meals manufactured by a miller normally represents only a small proportion of his total output of flour, but the quantity milled is governed solely by the requirements of his baker customers, who, in turn, base their orders on the demands of the public.

Many families like to have "brown bread" occasionally and are in the habit of buying a brown loaf once or twice a week, while in those households where light afternoon tea is the custom both brown and white bread are usually provided, but the total demand is small and the quantity of brown bread eaten remains fairly steady at about 5 per cent. of the total bread consumption of the country. There is little doubt that, in the absence of an alternative type, a very large number of people in this country would find that the taste of wholemeal bread soon palled to an extent which prevented their maintaining their normal consumption of bread.

It is also most probable that the continued consumption of wholemeal bread would cause a considerable number of people to suffer from disturbance of their digestive and intestinal

functions and, obviously, where such a happening occurred, a curtailment of the amount consumed would be bound to follow.

Animal Feeding Stuffs

The other important aspect of this problem, which is apparently overlooked, or is unappreciated, by adherents of the theory that the milling of all wheat to wholemeal is the best method of meeting the situation, is the serious reduction in the quantity of animal products available for human consumption which would follow the depletion of the supplies of animal feeding stuffs caused by transference of all wheat by-products to human food.

Animal products provide animal protein, which has certain nutritional attributes not possessed by vegetable protein, and contribute towards the requirements of vitámins, fats and minerals, and their inclusion in the diet in adequate amounts is, therefore, particularly desirable in war-time.

The most important of the foods derived from animal sources is undoubtedly milk, which has rightly received preferential consideration in the scheme for the rationing of animal foodstuffs, and Wright did not exaggerate when he stated in a recent publication, " . . . the first line of defence must be the adoption of adequate measures for maintaining the milk supply at its pre-war level ". The liquid milk yield of the country will certainly be related to the supplies of wheat by-products which are available to the dairy herds. It is true that wheatfeed is too bulky a material to be employed successfully as the sole food of dairy cows, but it is eminently suited to serve as the complementary food to protein concentrates and is present in considerable proportions in many dairy rations.

Value of Wheat By-Products

It will be of interest to calculate the loss of animal products which would be brought about were all the wheat milled into what was essentially wholemeal. In practice, of course, wheat by-products are utilised in the rations of most types of livestock and poultry and are thus fed for a number of different purposes, but in order to simplify the calculation the value of the wheat by-products will be expressed in terms of milk.

The annual consumption of flour in this country is 37,500,000 sacks of 280 lb. To produce this quantity of flour at a reasonable peace-time extraction of 72 per cent. requires approximately 6,511,000 tons of wheat. The residual wheat by-products would be 28 per cent. of this figure—namely, 1,823,080 tons.

Now let us assume that the extraction is increased to 95 per cent., a figure which corresponds to wholemeal from which 5 per cent. of the largest bran has been removed. To produce 37,500,000 sacks of flour, or rather meal, at this extraction requires approximately 4,935,000 tons of wheat, of which 5 per cent. or 246,750 tons will remain as wheat by-products.

The quantity of wheatfeed available annually for animal feeding purposes would, under these circumstances, be reduced by 1,823,080−246,750 tons, or 1,576,330 tons.

On the accepted basis that 5 lb. of wheatfeed will yield 1 gallon of milk, this quantity of 1,576,330 tons of wheatfeed is equivalent to 725,111,800 gallons of milk. This is an alarming figure inasmuch as it represents a quantity sufficient to supply throughout the year every person in the country with fully as much milk as a child receives under the cheap milk for schools scheme—namely, one-third of a pint per day.

Effects of Converting all Wheat into Wholemeal

To recapitulate: the conversion of all wheat into wholemeal, although reducing the quantity of wheat required to meet the nation's requirements of flour, would tend to lead to some falling off in bread consumption; would, because of the general unpopularity of brown bread, be likely eventually to have an adverse psychological reaction; and would seriously curtail the supplies of animal products and particularly of the valuable protective food, milk.

Furthermore, the apparent saving of shipping space effected by thus reducing the quantity of wheat needed to meet the nation's requirements of flour would be largely counterbalanced by the space required for the importation of either animal feeding stuffs or of processed milk in sufficient quantities to prevent a deterioration in the health of the nation. These facts make it clear that it would not be in the best interests of the country to attempt to meet the present situation by raising the flour extraction to the maximum figure.

War-time Policy

What then should be the policy with regard to flour extraction under the present circumstances? A slight increase over the peace-time extraction can be afforded, but the figure adopted should permit the production of a flour which is still essentially a " white " flour and should not seriously curtail the supply of animal feeding stuffs, and hence the yield of milk and other animal products. The present official extraction of 75 per cent. fulfils these requirements. Turning first to the question of the supply of animal feeding stuffs, it will be found that to produce the necessary 37,500,000 sacks of flour at 75 per cent. extraction requires 6,250,000 tons of wheat, of which 25 per cent. or 1,562,500 tons goes to wheatfeed. The loss of wheatfeed consequent on raising the extraction from 72 to 75 per cent. is thus 1,823,080−1,562,500 tons, or 260,580 tons. This reduction is less than 17 per cent. of the loss which would be occasioned by raising the extraction to 95 per cent.

75 Per Cent. Extraction Flour

Flour of 75 per cent. extraction, although naturally somewhat duller in colour than 72 per cent. extraction flour, is definitely " white " flour, and with present-day grists containing a high proportion of good grade Manitoba is not very dissimilar to the latter.

An increase in the flour extraction naturally raises the bran powder content of the flour, but the relationship is not linear, and the lower the level of the initial extraction the smaller is the increase in bran powder content for a given rise in extraction.

Thus, whereas the 10 per cent. rise in extraction from 75 to 85 per cent. increases the bran powder content by almost 5 per cent., the 3 per cent. rise from 72 to 75 per cent. does not lead to the inclusion of an extra 1·5 per cent. of bran powder but of only an extra 0·3 per cent. The difference in appearance occasioned by this latter officially adopted rise in extraction is therefore likely to pass unnoticed by the ordinary consumer. An extraction of about 75 per cent., therefore, permits the production of the type of bread to which the public are accustomed and which they can continue to eat indefinitely with relish, and at the same time avoids a serious shortage of animal feeding stuffs and hence of valuable animal products.

When the facts are examined in this light there is little doubt as to which of the two extractions, 75 or 95 per cent., offers the more economic plan for the utilisation of our wheat.

National Wheatmeal

Recently, however, the Ministry of Food have instituted a campaign to popularise a brown type of bread which they have termed National Wheatmeal. This bread is produced from a meal of 85 per cent. extraction and can be regarded therefore as a half-way step between white flour and wholemeal. In the author's opinion, the production of National Wheatmeal instead of white flour—that is, the replacement of the present extraction of 75 per cent. by one of 85 per cent., as is recommended by some authorities—would not be a sound economic policy.

The loss of animal feeding stuff occasioned by such a step would, of course, be only one-half of that caused by raising the extraction to 95 per cent., but it would, nevertheless, be serious.

The actual loss would be about 735,000 tons of wheatfeed, which, in terms of milk, is equivalent to no less than 338,000,000 gallons. Furthermore, although the public would not tire of this bread so quickly as they would of wholemeal, enforced consumption of it over an extended period would undoubtedly bring about the lessening of an appreciation of, and desire for, bread and hence lead to a reduction in bread consumption.

Other Disadvantages

There are two further disadvantages attaching to the adoption of an extraction of 85 per cent. The 85 per cent. meal will not keep so well as will ordinary white flour and, unless the stocks are turned over more frequently, a procedure which calls for extra labour and expense, there is a distinct possibility of spoilage occurring. Also, bread of the brown type stales more rapidly than ordinary white bread, and this is liable to lead to wastage in the home.

It would appear, however, that the authorities would be satisfied, at any rate for the time being, if their campaign led to 25 per cent. of the bread consumed in the country being eaten in the form of National Wheatmeal. In the writer's opinion, however, there is no economic advantage in this plan, and undoubtedly greater nutritional benefit can be derived from white bread plus milk than from a combination of white bread and wheatmeal with restricted milk.

The Nutritional Aspect

The nutritional aspect of the problem has been so far neglected in this article, but some consideration must be de-

(*Continued on page 207*)

THE SALMON

Part III.

THE EXAMINATION OF CANNED SALMON

This instalment concludes the series of articles on the salmon, Parts I. and II. having been published in the July and August numbers of FOOD MANUFACTURE. Part III. deals with the examination of canned salmon and the mild curing, smoking and freezing of the fish.

ELLIOT B. DEWBERRY, M.R.I.P.H., M.R.San.I.

REGULATIONS under The Meat and Canned Foods Act (1907) provide for the inspection, classification and examination of all Canadian canned salmon.

It has been the Government's practice in recent years to inspect all consignments of the product from canneries before permitting their sale or shipment.

Coding

Canned salmon is code-marked for identification purposes as follows:

Variety.	*Code Mark.*	*Canned Product.*
Pinks, or humpback, salmon ...	"P"	Smallest of all salmon and finely textured. Flakes small and range from a light to a deep pink colour. Has a delicate flavour and is more canned than any other species.
Spring, King or Chinook salmon	"T"	Flesh of soft texture and separates into large flakes, very rich in oil. Colour varies from deep red to white. Product sold in various grades.
Coho, silver or white salmon ...	"C"	Colour of flesh distinctly red, but lighter than Sockeye salmon. Flakes large.
Sockeye or red salmon	"S"	Flesh deep red colour. Small flakes and has a considerable amount of oil.
Chum, Keta or Dog salmon	"K"	Flesh of somewhat coarse texture. Colour light yellow. This is the cheapest variety of canned salmon.

Certificate Grades "A" and "B"

The examination of samples from consignments are carried out in the "Canned Salmon" laboratories, and if they are found to be fresh, firm and in good mercantile condition, etc., first-quality certificates (grade "A") are issued and the cans are embossed "Canada".

In judging salmon it is usual to examine one can from each withdrawal from consignments submitted for inspection, and, if found satisfactory, the lot may be classified on the condition of the cans so examined. Additional cans, however, may be opened for inspection if considered necessary.

Under certain specified conditions, shipments which are not up to the above standard but are sound, wholesome and fit for human food may be sent to market. These are embossed in large letters "Grade 'B'".

Cans embossed "Tips and Tails", which contain small pieces of salmon from the cutting machines, are sold at a reduced price. Under certain circumstances these cans may be classified as grade "A". All consignments not found fit for human consumption are either confiscated and destroyed or used by the Department of Fisheries for purposes other than for human food.

Notes on Examination

The sample salmon can, which must be clean and properly labelled in accordance with the regulations, should weigh at least that which is specified on the label. The cans are afterwards removed to a warm place and remain in an upright position overnight. This induces the oil to rise to the surface of the flesh, permitting quantity and colour to be judged. Generally speaking, the more oil present and the greater the depth of colour, the better the quality of the salmon. The oil is usually more plentiful when the can is a year old.

When opening a can of salmon the top should be carefully and completely removed so that, after inspection of the oil and salmon *in situ*, the contents may be slipped out unbroken.

Packing of the salmon should be uniform; it shows good workmanship. The odour should be agreeable and the flesh appetising; taste palatable, mellow and not too salt. The belly portion of the salmon is fatter and more palatable than the back or tail, but the entire body of the fish is utilised in canning.

Dry Salting the sides of Salmon and packing in Tierces. "Mild Cured Process." Skeena River, British Columbia.

(Courtesy Canadian Official News Bureau.)

The fish, on being removed from the can (the interior of which must be clean and fresh), is examined, and the skin should not show a reddish or black discolouration in first-quality salmon. There is a natural difference in colour between the back and belly. The darker skin on the back must not be confused with the red or black discolouration " water-marking " which indicates sexual maturity.

The flesh, when broken, should be uniform in colour. The deeper the colour, the better the quality. There must be no blood clots along the backbone, and the latter, if properly cooked, crumbles on pressure by the fingers.

In flat cans the salmon should be one solid piece of steak uniform in colour, and the flakes should break apart easily.

There are differences in quality between the best fish of any one variety caught and canned in different districts. For instance, Skuna River Sockeye salmon is the finest obtainable, being fatter and of better colour and flavour than Sockeye from most other districts.

The following are the local names for the different species of salmon :

British Columbia.	*Alaska.*	*Puget Sound.*	*Columbia River.*
Sockeye.	Alaska Red, Sockeye	Sockeye.	Blueback.
Spring.	Chinook, King	Spring.	Chinook.
Coho, Blueback.	Coho, medium red.	Coho, silver.	Silversides.
Pink.	Pink.	Pink.	Chum.
Keta, Chum.	Chum.	Chum.	

Test for Colour and Firmness

Instruments have now been devised for measuring accurately and rapidly the colour and firmness of canned salmon. The first is known as the " Armstrong Textometer ", and determines the firmness of the flesh. It consists of a levelling platform on which an opened can of salmon is placed and a special " head ", which is then lowered to contact with fish. Head carries a set of twelve needles, which are allowed to rest on, and penetrate, flesh for 5 seconds. At end of this period depth to which needles have penetrated is read off on scale, value obtained varying inversely as firmness of fish.

Accuracy of the apparatus is within 10 to 15 per cent. on any one can (much closer when several cans of the same lot are tested and averaged), and tests may be performed very rapidly.

The second is the " Armstrong Colorimeter ". This instrument estimates the various colour tints. The fish is transferred from can to a small receptacle, which is placed on the platform on left-hand side of the colorimeter. Receptacle is spun and, while spinning, colour is compared directly with standard Lovibond tints contained in the disc on the right of the instrument.

THE MILD CURING OF SALMON

King salmon is invariably used for mild curing because it is the only species large enough to meet the requirements of the trade.

Dressing

The head of the salmon is cut off, leaving a portion of the bony structure for attaching the hooks when the fish is smoked. The body is split open from belly to vent and the entrails, membraneous covering of the backbone, and fins are removed. The cavity is thoroughly washed out to get rid of all blood. Small cuts are made in the skin along the sides of the body, as this facilitates penetration when salting is carried out. The fish is then skilfully split into two sides. If the operation is done properly, no flesh is left on the bone, but a line of fat will show down the centre, which improves the appearance and adds to the value of the salmon. The bone is now carefully removed and the two sides—which should look alike—are washed in clean water and then in a weak brine solution containing crushed ice. They are placed on a table (skin side down) on which fishery salt has been spread, and this is gently but firmly rubbed into the flesh.

Packing in Salt

A quantity of salt is placed in the bottom of a tierce (fir or spruce barrel which holds about 800 lb. of fish), and the sides of salmon are carefully packed in it, layer upon layer, with a small quantity of salt between each, the process being continued until the tierce is full. In packing, the first sides are placed skin downwards, and the last skin upwards with an extra quantity of salt spread over the latter. From 85 to 100 lb. of salt are required for 800 lb. of salmon.

The tierce is headed up and pickle poured in through a plug hole (previously bored in the head) until it is quite full. The pickle is made to a strength of at least 90 per cent. of fishery salt, and broken ice is added if the weather is warm. It should be strained before use to remove froth and settlement. The strength usually weakens to about 70 per cent. during the first ten days of cure, but after the salmon is repacked it should not fall below 85 per cent., and will retain this strength for some time.

The tierces are rolled inside a cold store, where they are racked and kept at a temperature of from 35° to 38° F. They must be frequently examined and more pickle added if necessary. If any leaks occur, yellow spots will appear on the parts of the fish left dry. Several gallons of pickle are absorbed by the contents of each tierce during the first two or three weeks allowed for " pining ". The tierces remain in cold storage for at least 20, but not more than 90, days. Shrinkage during the first packing is about 30 per cent. Fish in good condition shrink less than those in poor condition.

Washing and Re-packing

The sides of salmon are taken out of the tierces and cleansed to remove all slime and salt and afterwards washed in iced water or, in the case of soft fish, in iced pickle. The washing depends on the condition of the salmon. The sides are weighed and graded. Those weighing 11 lb. and over (large fish) are graded " L ", those weighing 9 to 11 lb. (medium) are graded " M ", and those of less weight graded " S ". Fish in prime condition are classed as No. 1 quality.

The sides are counted and repacked in the tierces (no salt is added) and the latter filled with ice-cold pickle. About 14 gals. will be required to fill each tierce. The tierces are placed in cold storage and pickled at the bilge daily for at least a week. Each will contain about 830 lb. of salmon.

Fish which have been properly cured should keep in good condition for some months, provided the casks are sound and kept full of pickle.

The following particulars are marked on the tierces : Number of sides, the tare, gross weight without the pickle, and the quality of fish—" L," " M " or " S ".

SMOKED SALMON

For the mild cure the salmon sides are taken out of the tierces which have been in cold storage and soaked for 12 hours in tanks of water, the latter being changed several times in order to remove as much salt as possible. Salinity depends on the length of time the fish have been stored. The sides are removed from the tank and the water thoroughly drained off. Each side is laid (flesh side down) and a bacon hanger (which is constructed of wire and has six or more points bent at right angles terminating in a hook) is pressed firmly into the skin. The sides are afterwards hung up in a smoke-house in such a manner as not to touch each other.

Small fires of non-resinous wood (alder wood is generally preferred) are placed beneath and the ventilator of the smoke-house left open to allow moist air to escape. The heat from the fires must not be too great, as the object is to smoke the fish, not to partially cook them. For a mild cure, smoking from 8 to 10 hours is sufficient.

If the salmon are not for immediate use they should be placed in a cold store and kept at a temperature of about 24° F.

For a harder cured salmon, smoking must be continued for two days. The ventilators of the house are partly closed and sawdust is placed on the fires, producing a dense smoke, which gives the required colour to the salmon. Care must be taken to see that no sweating of the fish occurs during the process.

Scottish Method of Curing and Smoking

The salmon is washed, the head removed, and the fish split from belly to vent. The roe and intestines are taken out, and the fish again washed to free from blood, etc. The fish is placed in a mixture of equal quantities of fishery salt and brown sugar for 48 hours. Some curers add a small quantity of saltpetre to the mixture. The salmon is afterwards hung in the open air or

in an ordinary kipper or finnan kiln. Three small double-pointed sticks should be fixed through the skin at intervals along the back to keep it spread out during the process of drying. If placed in a kiln a few hours' smoking is recommended.

The above process can only be regarded as a temporary cure, and salmon so treated will keep for about the same period as kippered herrings or finnan haddocks.

Norwegian Methods of Curing Salmon

For the mild cure the head is removed and the salmon split from belly to vent. The roe and intestines are taken out and washed free from blood and placed in salt pickle for three days. It is again removed and washed and then stretched upon pieces of thin lath about 1½ in. in width and cut to a length corresponding to the breadth of the fish. One of these spits (which is sharpened at each end) is placed across the back of the fish at the lugs or shoulders and another half-way down, the points of the spits being stuck through the skin. The fish is then hung up in a chimney and smoked over a fire of fir branches from one and a half to two days.

For the hard cure the salmon is washed, the heads removed and the fish split into sides. The roes and intestines are taken out and the fish again washed to free from blood, etc. Each of the sides is laid (skin side down) on a table and a mixture of equal parts of brown sugar and fishery salt is gently but firmly rubbed into the flesh.

A quantity of the salt mixture is then placed in the bottom of a barrel and the sides of salmon carefully packed in it—layer upon layer—with a quantity of the mixture between each layer. The barrel is filled to the top with a pickle solution containing 80 to 90 per cent. of salt, the end of the barrel is put in and tighted and laid on its bilge for a period of from 20 to 90 days.

The barrel should be opened occasionally and the fish and pickle examined. If the latter is found to have become stale, fresh pickle should be substituted and the sides of salmon well washed in clean pickle before being repacked. When the fish are required they are removed from the barrels, well washed in clean water and afterwards smoked in the same manner as for mild-cure fish.

The sides of salmon are wrapped in greaseproof paper and packed in wooden boxes, each holding 30 lb.

Frozen Salmon

Freezing does not in any way alter or destroy the flavour of salmon. They must be, however, in prime condition, undamaged and fresh. The quicker they are frozen after being caught, the better the natural flavour will be preserved. The chemical constituents are practically identical with those of fresh fish.

Coho or Chum are the species found most suitable for quick freezing.

Modern Plants

In modern refrigerating plants the temperature ranges from −35° to −45° F. The process is by direct expansion, and each freezer is piped with about 2 ft. of 1¼-in. pipe per cubic foot of freezing space. The bunkers are in pairs, generally 9 pipes wide, spaced 10 ins. apart, leaving about a 3½-ft. passage through the centre of each freezer. The salmon are laid on metal sheets, which are placed on the tiers of pipes, and, when frozen, are passed through openings in the rear of the freezers into the glazing-room, where a temperature of 20° F. is maintained. Here they are dipped in water and, when removed, are covered with a layer of ice, which is thickened by repeated dippings.

The heavy glaze prevents drying, subsequent yellowing during storage and damage to the fish when handled. The time taken to freeze a 3-in.-thick salmon is about six hours. They are then removed to storage-rooms and kept at a temperature of about 0° F.

Packing

When required for shipment the frozen salmon are covered with parchment, wrapped in thick brown paper and packed in boxes, each box holding 250 lb. of fish.

In recent years it has been shown that the rate of freezing can be greatly accelerated if the air in the freezers is circulated at a uniform speed of 6 ft. per second. This quick freezing improves the quality of the salmon. Modern research has proved that the ideal temperature for the storage of fish of a fatty nature such as salmon—in which rancidity tends to develop—is −20° F.

LIABILITIES (WAR-TIME ADJUSTMENT) ACT, 1941

By this Act, officers called Liabilities Adjustment Officers (one for each County Court district) can be called upon by a debtor in serious financial difficulties through the war for advice and assistance in coming to terms with his creditors by a " scheme of arrangement ", and where a business is being carried on particular efforts are to be made to evolve a scheme which will preserve that business, or if the business is suspended through war exigencies a scheme which will enable the debtor to recover the business when circumstances permit.

If a scheme is arranged acceptable to all the creditors and the debtor, the officer approves it and then it becomes legally enforceable; moreover, if only a majority of the creditors are agreeable, the scheme nevertheless can be approved, but any dissenting creditor has then right of appeal to the County Court (in relevant cases the High Court).

A scheme can provide for the composition of debts, the postponement of payment of debts, the assignment or charging of any property of the debtor in favour of the creditors, and the management or disposal of the debtors' business or any other property of his; moreover, if the other parties agree, the scheme can vary the terms of any lease, mortgage, or contract to which the debtor is a party.

Liabilities Adjustment Orders

If a scheme of arrangement cannot be agreed upon, recourse to the County Court (or High Court if the case so requires) can be had, the eventual outcome, if the court agrees, being a Liabilities Adjustment Order, and still this machinery is different (as is the scheme of arrangement procedure) from the debtor going through the Bankruptcy Court, and the disabilities inherent with bankruptcy do not follow. But for an application to be accepted the court must be satisfied that, owing to war circumstances, the debtor is unable to meet his obligations or is in such a position that if he were required to pay his debts and to meet as they fall due any future liabilities in respect of obligations already incurred, he would have no reasonable prospect of preserving or recovering his business or would otherwise lose his means of livelihood. From the foregoing it will be seen that a debtor can apply even though he may be able to pay his debts in full, but that if he did so he would be handicapped in carrying on (or unable to recover the business eventually); as example, he may have sold most of his stock without opportunity of replacement, and so to this extent capital is in his possession.

In the first instance, a " protection order " is issued, which really is a standstill order, as all proceedings are then stayed and new ones cannot be commenced. Careful consideration is then given to the case, and if the above conditions for action to be taken are considered fulfilled a Liabilities Adjustment Order is issued.

The order will particularise many matters—for instance, how and when payment of the debts is to be made, and whether in full or at something less than 20s. in the pound, and for this purpose any property of the debtor (whether currently existing or likely to become available) may be realised, and the debtor may be required to pay sums out of his future income, but the court has discretion to postpone realisation of any property which may be temporarily depreciated in value and for any other sufficient cause.

Provision may be made for the maintenance of the debtor and his family, and the order may except from any property to be realised, premises used (or which would have been used if war circumstances had not intervened) as a home by the debtor, and any furniture, bedding and clothing of the debtor and his family, and any trade tools of the debtor.

The foregoing applies generally, but where there is a business, that business and the business and other relevant premises may be excepted from any property to be realised, and the court also has power to postpone the payment of any or all of the debts. Furthermore, the court may also allow sums to be borrowed by the debtor for the purposes of the business and make provision for the repayment of these sums and for the payment of interest in connection therewith. But where the question of a business arises, it is mandatory (the Act so provides) upon the court that in exercising the power given, regard must be had to the prospects of the business and the likelihood of ultimate benefit to the creditors as well as to the debtor.

FOOD LEGISLATION

IN PEACE AND WAR

Part II.

In the concluding instalment of his articles (Part I. was published in the August issue) the author, in the course of a review of present-day food legislation, discusses certain dangers attaching to the continued adoption of lower standards in food production, and emphasises the need for laying the foundations of peace-time legislation during, and not after, the war.

THOMAS McLACHLAN, F.I.C.

Cream Cakes and Pastries

A CONSIDERABLE amount of public money has been expended in an endeavour to obtain a settled legal decision as to what constitutes a cream pastry or a cream cake. The introduction of artificial filling in pastries would appear to date from the war of 1914-1917, when it was illegal to sell cream pastries containing cream, with the result that *éclairs* and similar fancies were filled with an artificial preparation. If the repeal of emergency legislation had included a note to the effect that cream fillings should henceforth be composed of genuine cream, there would have been no doubt in the matter, or if, when the original Order had been introduced, it had been stated that the word "cream" should not be employed for the cream substitute, all would have been well. As it is, the Minister of Health appears to be waiting to see which party wins, and as Public Health Authorities have to consider the public purse and, moreover, since yet another war, with its consequent emergency legislation, has broken out, it is doubtful whether courts will be further troubled in this matter and the responsibility must lie with the Minister of Health. Of course, it must not be forgotten that when buying cream crackers, cheese biscuits and similar articles, one does not expect to find genuine cream or cheese in them, but to find counsel using this as a reason why cream cakes containing cream-like fillings need not necessarily contain cream, and supporting the argument by pointing out that shoe cream, furniture cream and vanishing cream do not contain cream is surprising and shows that the courts are presumably unaware of the Trade Marks Acts or this analogy would break down. It is instructive to observe that the Germans used the word *Sahne* (meaning cream) for cream or preparations containing cream and the French word *crème* for cream-like substances. Thus an *éclair* would be either a *Sahne-éclair* or a *Crème-éclair*, according to its filling. Vanishing cream and cold cream were vanishing-crème and cold-crème respectively, but perhaps one cannot speak with certainty as to these English names now that their language has been "purified"! The nearest approach that we have in this respect is to call a mixture containing 40 to 50 per cent. of chicory with coffee "French Coffee", which is not exactly a compliment to our former allies.

Custard Powders

This is one of the titles which is now so commonly established by custom that it would be impossible to interfere with it, but it is an illustration of the weakness of our food laws which allowed such a title to be introduced for something which did not resemble what was at the time commonly believed to be a preparation made from milk and eggs with sweetening and flavouring, called custard.

Egg Substitutes

Egg substitutes fall into the same category as custard powder in one direction and as baking powder in another. Like custard powders they are supposed to be capable of reproducing the effects of eggs without their use and, like baking powders, most of them are actually baking powders with a little colouring matter added. Liverseege in *Adulteration and Analysis of Foods and Drugs* is very severe on egg powders and is glad to note that they are now almost universally known as egg-substitute powders, though the word "substitute" is sometimes printed in smaller type than the word "egg". His successor to the office of Public Analyst for the City of Birmingham is just as scathing in his criticisms, and in his latest quarterly report condemns advertising claims which are at present being made for certain powders. He quotes the case of a powder which claims "if you cannot get custard made with new-laid eggs, you must have custard made with ——, the egg-like custard powder". Needless to remark, he finds that the composition of the powder is similar to that of ordinary custard powder. In another case he examined a powder and found it to contain wheat flour with 2·2 per cent. sodium bicarbonate, a little gum and colouring matter. Actually, it seems probable that the analyst missed the presence of a small quantity of soya flour. This powder represented itself as being essentially egg by its title, and later the manufacturers offered to redescribe it by saying that every ounce represents six eggs in effect. Finally, an arrangement was reached by which it was stated that one ounce should be used instead of six eggs for cooking purposes. In a third case the packers claimed that every ounce of powder was equivalent to five beaten whole eggs, and this claim also had to be repealed. In a way, manufacturers are to be pitied if they try to put up a genuine egg substitute, because coloured baking powders have held the market for so many years as egg substitutes that anyone buying one which did not effervesce would think they had been defrauded. Coloured baking powder is not a substitute for eggs in that it does not retard staling or hold moisture, but to ask the manufacturer of his own free-will to give up the name of egg substitute for coloured baking powders or the public to cease to expect them to be as at present known would be like asking the English to call the "doctor" a physician or a "chemist" a pharmacist! The names should never have been allowed to gain a hold on the public and the public should never have been persuaded that they can use these egg substitutes instead of eggs, because they appreciate quite whole-heartedly that baking powder cannot be substituted for eggs. Greater power exerted by the Minister of Health in support of the public analyst is all to be desired, and the Minister possesses this power under that section of the Food and Drugs Act enabling him to make Statutory Rules and Orders. In the meantime those manufacturers wishing to place genuine egg substitutes on the market, which are not of the effervescent type, should endeavour to find names which do not imply that their commodity does actually contain egg and also to avoid the description egg substitute. Good titles could be easily obtained from advertising experts. Egg substitutes do serve, however, as an excellent illustration of the fallacy of allowing something which is not a real substitute to be called by a name implying that it is.

Honey

In order to prevent the sale of preparations as honey which are not honey or which contain only small quantities of honey, legislation should be introduced on the lines of the Order made under the Agricultural Products (Marking and Grading) Acts, and at the same time a requisition might be included to require a certain diastatic activity for raw honey. Prepared suet and purified honey of the British Pharmacopœia are sold under those names and not as suet or honey, so there would appear to be no reason why honey, which has been heated to such an extent that the diastatic activity has been destroyed, should not be sold as prepared honey.

Ice Cream

For many years there has been a continuous agitation to obtain legislation which will ensure that the term ice cream shall be applied only to a product containing about 12 per cent. or more of milk-fat, due to the addition of actual cream or butter-fat. Owing to restrictions on the sale of cream it is temporarily illegal to sell ice cream containing butter-fat, and other fats and oils have had to be substituted. These preparations are palatable and are finding a public, which has become accustomed to ice creams and wants something to take their place. Consequently there is a considerable sale for the modi-

fied article, and it may require a great effort after the war to reinstate ice creams containing real butter-fat in their old position. Many people adopt the attitude that the public will demand the return of cream to ice cream, but can the public always tell what it is purchasing and do not many people say that if they can obtain an article, which is not inferior so far as they personally can see, and pay less for it, they see no reason why it should not be sold? This is just another instance of the degradation of a name which was being built up after years of patient work.

Jams

Jams are a very good instance of one Government Department adopting standards different from those set up by another Government Department. Some ten years ago the Council of the Society of Public Analysts came to an agreement with the Food Manufacturers' Federation regarding standards for jams. Full-fruit and other grades were arranged and standards were also set for marmalade. Later on, the Minister of Agriculture in his wisdom made various Orders under the Agricultural Products (Marking and Grading) Acts in which entirely different standards were adopted, but, with a war on, the Ministry of Food has adopted the standards originally set by the Society of Public Analysts and food manufacturers. Owing to the shortage of sugar the Ministry of Food might reasonably have argued that it would be advisable to include more fruit in order to reduce the amount of sugar necessary for the preservation of the jam. Except that the author has made excellent jams using even less fruit than those required by the full-fruit standards when using fresh fruits, he feels that the amounts of fruit required are on the whole too low and should approach more nearly to those of the Minister of Agriculture. In any case, this is definitely a case where the Minister of Health should make up his mind and give a decision as soon as the war is ended.

Lard

Lard was the subject of some controversy a few years ago, when suggestions were made in high scientific circles that lard should be partially hydrogenated before sale in order to harden it and to increase its life. It may quite fairly be argued that one may alter the composition of lard by the food given to the pig during its lifetime, but one fails to agree that this is a legitimate reason for altering its composition after the death of the animal by purely chemical means and then to sell the resulting product as lard. There is no objection to the hardening of the fat; such would be illogical; the objection is to the retention of the original name lard for an altered product. The suggestion that the hardening would not be carried very far does not affect the issue at all. The sole consideration is that such a process would permit the introduction of chemical treatment of natural products, and it would be difficult, if not impossible, thereafter to define a line beyond which the manufacturer could not go.

Lemon Curd

In 1925, Dr. G. D. Elsdon raised the matter of standards for foods in the *Analyst* and took lemon cheese as an example. He showed that whereas a home-made lemon cheese might be expected to be made from butter, sugar, eggs, lemon peel and juice, products were then on the market prepared from sugar, glucose, tartaric acid, margarine, starches, gum tragacanth or starch gum, margarine and flavouring materials. Some of the lemon curds examined by the author have been flavoured with a mixture of lemon and citronella oils. Elsdon stressed the fact that he felt that standards are necessary for a large number of foods, and in this respect he differed from the late E. R. Bolton, who maintained that the danger of standards is that the tendency is for a product to descend to the standard, as has happened with butter. Bolton felt that a standard was only necessary when there was any possibility of the public being defrauded in its absence. This argument has been employed by many very able chemists and manufacturers, but the difficulty is that with scientific research it is a comparatively simple matter to debase a preparation without altering its appearance to any appreciable extent.

Potted Meat, Meat Pastes, etc.

Prior to the outbreak of the war there have been many prosecutions for selling potted meat containing added starchy fillings, and it has been held that a potted meat should be composed solely of meat and spices. Meat rolls and brawns come into the same category in peace-time, though it is now generally allowed that meat pastes which are to be spread on bread require the addition of a small quantity of a starchy filler. That this was not always recognised is illustrated by the fact that a vendor was fined in 1921 for selling ham and chicken paste which included 41 per cent. of starchy filler and water. In another case in 1926 a vendor undertook to change the description of an article sold as chicken roll to "Delicious Roll—Chicken and Ham Flavoured". Some firms have adapted themselves to present war-time legislation and products such as "The Original Wiltshire Savoury" are appearing on the market. Firms who refuse to debase the names associated with products of a definite standard and quality may need legal protection when the war is ended, and it will be the duty of the Minister of Health and the Local Authorities to support them.

The practice adopted by some manufacturers of adding tinned salmon to meat pastes or of adding meat to fish pastes is one which is to be deprecated, since many purchasers may have their religious or other convictions severely violated by these methods.

Sausages

Leach, *Food Inspection and Analysis*, considers the addition of starchy material to a sausage to be an adulteration, but in this country it has usually been assumed that a percentage of starch filling in the form of bread or rusk is permissible and that a sausage should contain from about 65 to 70 per cent. of actual meat. With the outbreak of the war, three grades of sausage were defined and of these only the lowest is now permitted to be made—those containing from 30 to 45 per cent. of meat. With every standard there is a tendency for the lowest figure to become also the highest; sausages examined by the author have usually been found to contain about 31 per cent. of meat. One may legitimately ask what we are to expect after the war, when people have become accustomed to a sausage containing such a small percentage of meat. Will legislation be introduced to raise the standard or are we to accept a lower quality article and find another name for the original sausage? The question is not so fantastic as it may appear at first sight.

Shredded Suet

During the war of 1914-1918 an Order in Council was made permitting the addition of 17·5 per cent. of rice flour to shredded suet. At the end of the war this Order was repealed, but it is now generally accepted that shredded suet should contain not less than 83 per cent. of fat, so that about 15 to 17 per cent. of rice flour may be added according to the quality of suet employed. Any attempt to enforce such standards depends, however, on the Local Authority persuading the manufacturer to fall into line or on a bench of magistrates accepting such a standard. It is obviously in the public interest that it should be unnecessary to rely on case law and that some definite decision should be made which will be fair to all parties.

Sugar Substitutes

There are some cases where there is little necessity to initiate legislation in order to protect the public, for where the palate is sufficiently educated the purchaser is quick to detect a fraud and to demand reparation. As a result of the rationing of sugar many substitutes have come into the market, and of these at least 20 per cent. fail to comply with the claims made for them, but in the author's experience the public has been quick to draw the attention of the Local Food Office to the preparation and the manufacturer has been called to order. In some of these instances the manufacturer has acted in sheer ignorance, but it has to be remembered that if anyone wishes to place a substitute or a preparation on the market it is necessary for him to see that it complies with any claims which he may make for it. The admixture of calcium carbonate and starch with saccharin is obviously made in ignorance, yet this has been done.

Vinegar

Owing to the confusion in the various terms applied to vinegar the Association of Vinegar Brewers appealed to the Local Government Board in 1911 for a definition of vinegar. The Board replied that it had no powers to make such a definition, but suggested that as a general standard vinegar should be a liquid derived wholly from alcoholic and acetic fermentations and that artificial vinegar is any vinegar or substitute

containing acetic acid not wholly derived from alcoholic and subsequent acetous fermentation. The controversy continued for many years and became more acute with the introduction of diluted pure acetic acid, which, after storage in old wine casks, developed a tolerable aroma and flavour. Eventually an agreement was reached between the Council of the Society of Public Analysts and the Malt Vinegar Brewers' Federation defining vinegar, distilled vinegar and spirit vinegar, and leaving it for artificial vinegar to be sold as artificial vinegar.

The matter was brought to a head when the City of Westminster brought an action against a manufacturer for describing an article prepared from acetic acid as "Table Vinegar". After a hearing lasting some days a decision was given in favour of the Council, and this action has been treated more or less generally as a test case. It is a pity, however, that the Minister of Health should have left the matter to be fought out in the courts rather than to have made an Order himself, which would have saved much recrimination. In the discussion on cream cakes, mention was made of the introduction of the argument that the terms cream, furniture cream, vanishing cream, etc., are generally recognised without complaint, and that therefore the word cream can legitimately be applied to cream cakes not containing cream. It is interesting to note that in a vinegar case in 1803 the Recorder was faced with the fact that the Vinegar Act, 1844, defines shoemakers and various other people as vinegar manufacturers because they use acetic acid in their manufactures. His reply is worthy of note in that he pointed out that the object of Acts of Parliament was to ensure that all duties should be enforced and that for this purpose it might be necessary to class certain people as vinegar makers, but that this did not mean that all products which they manufactured and were liable to duty were to be considered as vinegar. In the same way, preparations obviously not containing cream or likely to be mistaken for cream, but which have a creamy consistency, fall in a different category from those which do appear to be cream and are likely to be mistaken for it.

In conclusion, it will be realised that the number of articles which might be dealt with could be greatly extended and that those which have been selected are typical of foods as a whole and form a basis for discussion. The views expressed are, of course, those of the author and do not necessarily represent those of the trade, the public or the public analyst in general. There may be many who feel that the present is not the time to discuss the subject of peace-time legislation, but as there is much truth in the axiom that to ensure peace it is necessary to prepare for war, so there is also good reason to think that if we want lasting peace-time legislation we should lay the foundations of it during the war and not wait until peace has been declared.

CONTROL OF FACTORIES AND WAREHOUSES

A BOARD OF TRADE Order published by the Stationery Office is likely to have far-reaching effect on the use of factory and warehouse premises.

The Order—The Location of Industry (Restriction) Order, 1941—provides that no person may, without a licence issued by the Board of Trade—

(1) Carry on at any factory or warehouse having an area of 3,000 or more feet super any trade or business not carried on there previously, or

(2) Carry on at other premises having an area of 3,000 or more feet super, whatever their previous use, a business of production or storage.

The object of the Order is to facilitate provision through the Control of Factory and Storage Premises of factory and storage accommodation urgently required for Government purposes.

The Order does not apply to shops or to new buildings, and a general licence is being issued providing for the use of premises for temporary storage purposes without a specific licence, but the Control must be informed in writing if any premises are so used.

Special consideration will be given to applications by firms dispossessed by enemy action, or through other causes outside their control, to use alternative premises in the vicinity of their former place of business.

An Explanatory Memorandum explaining in detail the scope and purpose of the Order and the method of applying for a licence is available from either the Headquarters or Regional Offices of the Control of Factory and Storage Premises, Board of Trade, or local Chambers of Commerce.

Copies of the Order (S.R. & O., 1941, No, 1,100) are obtainable from booksellers or H.M. Stationery Office.

The following is a list of Regional Offices for Control of Factory and Storage Premises:

NORTHERN REGION.—Northumberland, Durham and Yorkshire (North Riding). 34, Grainger Street, Newcastle-on-Tyne. Tel. No.: Newcastle 28831.

NORTH-EASTERN REGION.—Yorkshire (East and West Ridings). Woodville House, 29, Vesper Road, Kirkstall, Leeds 5. Tel. No.: Headingley 54107.

NORTH-MIDLAND REGION.—Derbyshire, Nottinghamshire, Lincolnshire, Leicestershire, Northamptonshire, Rutland. Dudley Lodge, Peveril Drive, Nottingham. Tel. No.: Nottingham 41025.

EASTERN REGION.—Cambridgeshire, Bedfordshire, Huntingdonshire, Norfolk, Suffolk, those parts of Hertfordshire and Essex not included in the Metropolitan Police Area. G.F.S. House, Park Terrace, Cambridge. Tel. No.: Cambridge 56206.

LONDON AND SOUTH-EASTERN REGION.—The Metropolitan Police Area, Surrey, Kent and Sussex. 25, Victoria Street, London, S.W. 1. Tel. No.: Abbey 3206.

SOUTHERN REGION.—Oxfordshire, Buckinghamshire, Berkshire, Hampshire, Dorsetshire. Burberry Buildings, Mill Lane, Reading. Tel. No.: Reading 4851.

SOUTH-WESTERN REGION.—Gloucestershire, Wiltshire, Somersetshire, Devonshire, Cornwall. 11, Chantry Road, Bristol 8. Tel. No.: Bristol 37604.

WALES.—10, Cathedral Road, Cardiff. Tel. No.: Cardiff 5803.

MIDLAND REGION.—Staffordshire, Warwickshire, Worcestershire, Herefordshire, Shropshire. Somerset House, 37, Temple Street, Birmingham 2. Tel. No.: Midland 3076.

NORTH-WESTERN REGION.—Cheshire, Lancashire, Westmorland, Cumberland. Lombard Chambers, 46, Brown Street, Manchester. Tel. No.: Deansgate 2578.

SCOTLAND.—95, Bothwell Street, Glasgow C 2. Tel. No.: City 6511.

The Economic Utilisation of Wheat

(*Continued from page 201*)

voted to it since nutritional claims are the basis of some arguments advanced in support of National Wheatmeal. National Wheatmeal will be higher in protein content than 75 per cent. flour produced from the same grist, but the apparent advantage of wheatmeal in this respect is lessened in practice by the lower digestibility of its protein. The nutritional superiority of wheatmeal over ordinary white flour lies mainly in its higher vitamin B_1 content, but no such advantage can be claimed over fortified white flour—*i.e.*, white flour to which has been added 0·2 g. of aneurin per sack of 280 lb. Fortified flour is now being supplied to one region of the country and it should not be long before fortification is extended to all white flour. When this happens the superiority claimed for National Wheatmeal on the score of B_1 content will no longer be valid.

Vitamin B_2

It has also been suggested that the higher vitamin B_2 content of 85 per cent. wheatmeal favours its adoption in place of white flour. Even 85 per cent. wheatmeal, however, is a comparatively poor source of the B_2 complex, particularly compared with milk, which has a much greater B_2 potency. The deficiency of B_2 in white flour can, therefore, be compensated for much more effectively and more economically by feeding the wheat by-products to dairy herds, and thus maintaining the milk yield, than by consuming them in the form of wheatmeal.

It is, of course, impossible in an article of this length to discuss the many aspects of this important problem in great detail, but it is submitted that the facts and figures which have been presented reveal that the most economic and advantageous method of utilising our wheat supplies under existing circumstances is to produce flour at about 75 per cent. extraction, to fortify this with vitamin B_1, and to employ the wheat by-products for the maintenance of the supply of animal products and particularly of milk.

BOOK REVIEWS

STARCH AND ITS DERIVATIVES

In his preface to one of the latest additions to the series of monographs on applied chemistry, the editor declares that it is the first duty of the monograph writer to estimate the value, either actual or potential, of recent work upon the subject of which he writes; he must pick out the plums to save others from the indigestion that follows eating the whole pie. Further, in addition to being accurate, his work must be presented in a form that is both assimilable and attractive; in other words, he must show that lucid exposition can be achieved by the use of a few words, if they are rightly chosen, and that attractive presentation is attained by clear thinking rather than by superficial display.

As the editor adds, " the task which the authors have been set is no easy one ", but the ideal set up is excellent and should impel writers to " cut the cackle and get on with the 'osses ".

The increased interest taken in the manufacture of starch and its derivatives makes a recent book* very welcome at the present time. Potato starch is not at present being made in this country, although one hears of projects for its manufacture. Dextrine and glucose are other products which are having the attention of would-be manufacturers.

Most of us know that we owe the delights of roast pork, according to the gentle Elia, to a house fire. Less well known is the story of the start of the British gum industry.

According to well-authenticated reports, a fire broke out in a textile mill in Dublin. One of the workmen noticed that the starch that had turned brown by the heat of the fire had altered greatly in physical characteristics, becoming readily soluble in water to give a thick adhesive paste. The roasting of starch was repeated and the basis of the large industry of the manufacture of British gum was thus laid.

The author devotes only three pages to the historical aspect of his subject, but in those three pages he gives nineteen references to the literature.

In his chapters on the structure and reactions and physical chemistry of starch the author is content with reviewing the work done from 1800 to 1939, and, with regard to structure, concludes that the evidence is often conflicting, possibly because of the different conditions under which it was obtained; and although much of it is suggestive, more work still is required before the structure of starch is finally and thoroughly understood.

The theoretical part of the book ends with considerations of starch iodine and the ethers and esters of starch.

The second part is devoted to practical aspects of manufacture. The production of root starches is well described and pictures of some plant are given, and the same thing is done for the cereal starches. There is probably no book that has ever been written which would enable the neophyte to embark upon the industry of which it treats without further aid. This may appear to be a truism, but the fact remains that there are a few people who say, in effect, " We intend to start such and such an industry—what's the best book to get?"

Whether it be a monograph or a full-sized textbook, it can certainly be of help to show the newcomer what he is going to be up against. It will also indicate the literature on the subject, and, perhaps most useful of all, this literature will give the names of experts in the particular industry, some of them able and free to give advice but unable to tell the world that their valuable services are available because of professional etiquette.

The manufacture of glucose and maltose is given a chapter. The author mentions three forms, (*a*) starch syrup, glucose syrup or corn syrup, (*b*) glucose, (*c*) commercial dextrose, and gives details of earlier and later processes for making these derivatives.

Before 1914 the main sources of supply of acetone were the United States and Austria, but in 1915 Dr. C. Weizmann suggested to the Admiralty the use of bacterial fermentation of maize and other substances containing starch. Owing to the price of raw materials, the success of the process appears to be more assured abroad than at home, as the chief sources of raw materials here are potatoes and horse-chestnuts. The manufacture of acetone and ethyl alcohol, and dextrin and British gums conclude the second part of the book.

Part three devotes itself to the industrial applications of starch and starch products, and covers adhesives from starch and dextrin, the paper industry, and the textile industry.

A chapter on the miscellaneous uses of starches and dextrines is included in this section. In view of the fact that starch is widely used in the food industry, it is a pity that the author gives this aspect of the subject so little space—he is content to allocate two pages to it.

A final section deals with the examination and analysis of starch and its products. The different methods are well described and the copious references will be found useful to the chemist.

Some clear photo-micrographs of the principal starches conclude a book which should interest chemists who are directly or indirectly connected with the starch industry.

T. C. W.

* Starch and its Derivatives. *J. A. Radley, M.Sc., A.I.C. Pp.* 346+*x.* 22*s. net.*

WHALE OIL—AN ECONOMIC ANALYSIS

The increase in demand for sources of fats gave impetus to the search for new ones, and among these whale oil has rapidly regained a key position which it once held for centuries, after having fallen almost into oblivion for several decades before and after the beginning of this century. A book* devoted to an analysis of the economic problems connected with whale products has recently been published. It is divided into three parts. Part I describes whaling methods, and discusses whales as a source of raw material. The history of whaling; international competition and co-operation; and whale products and their utilisation are also discussed.

Part II considers the world's whale oil supplies; whaling costs and profits; demand for whale oil; transport storage and marketing; duties, taxes and protective measures, and the price of whale oil.

The outlook for whale oil and whaling is considered in Part III.

An appendix giving tables on production, stock, prices, etc., and a bibliography are included.

* Whale Oil—An Economic Analysis. *By Carl Brandt. Pp.* 264+*ix. Stanford University, California.* $3.00.

T. C. W.

SOUTH AFRICAN MARKET FOR STARCHES

By a Correspondent in Cape Town

A market for potato starch exists in the Union of South Africa. During 1935-1940 the average annual imports were 545,354 lbs. Prior to the war the Netherlands was the only important supplying country. Small quantities were credited to the United Kingdom and Poland, but about 97 per cent. came from Holland. There is no domestic production of the commodity. The imported product is used by the foodstuffs industry, perhaps principally by manufacturers of sausages and similar meat products, but it is also used as an ingredient in other food products.

While potato starch is not made in South Africa, corn starch, which can be used as a substitute, is produced extensively from an abundant supply of the raw materials grown in the country. Since potato starch from the Netherlands no longer is obtainable, this corn starch has been utilised to an ever-increasing extent, and former consumers of potato starch are not dissatisfied with the results obtained, particularly in view of its comparatively low price. For some purposes the potato product is still preferred, however, and if the price is low enough exporters could do a certain volume of business.

Before the invasion of the Netherlands, Dutch exporters sold at £12 10s. per longton c.i.f. Cape Town. There is an import duty of 1½d. per lb. on imported starch, thus making the landed costs at this price slightly above £26 10s. per ton. South African corn starch is currently quoted at £20 to £21 per ton.

During the past year there have been some imports of potato starch from the United States. Quotations, which are in American funds, are c.i.f. Cape Town per sack of 200 lbs., and include a 5 per cent. commission. In July, 1940, business was done at $18.38. Prices dropped thereafter to $16.74 in September, $13.43 in November, and $12.13 in December.

FLIES IN FOOD FACTORIES

ERIC HARDY, F.Z.S.

THE most modern of food factories are equipped with non-opening windows and whose different departments are sealed against any air but that which is supplied by the appropriate plant, which delivers it filtered and at specified and controlled conditions of temperature and humidity. In such factories, whatever be the circumambient conditions, a fly is never seen. However, the adoption of air conditioning is by no means general, and flies still constitute a veritable plague when they find attractive food and other favourable conditions.

Flies—A Danger

Apart from its "nuisance value"—and this may be a very real thing to the operative handling such foods as meat, etc.—the house-fly is a very real danger by reason of its peculiar feeding habits. It has only soft sucking mouth parts and does not bite like the stable-fly. To feed, it vomits forth a mass of previously swallowed sputum or excrement and then sucks or pumps in its new meal in solution. The contamination danger of the house-fly to the food industry may be imagined when it is said that between 550 and 6,600 million bacteria have been counted on a single specimen.

Favourable Conditions

When temperature and humidity rise to an optimum (as it does in central-heated, badly ventilated rooms) the life history of the fly is speeded up, and a temperature of 30° to 35° C. will bring maggots to maturity in five days, and the adult fly will hatch in three or four days, laying from 100 to 150 eggs at a time four days after mating, and will itself live for a period of not more than five months unless it hibernates for the winter to lay eggs in spring. At a temperature of 25° to 30° C. the whole life history from the egg to fly may take nine or ten days and a second generation be started fourteen days later. In conditions of suitable warmth, humidity and food supply the fly will continue breeding throughout the winter without hibernating, and this is the case in some factories and especially in bakeries and restaurants.

Problems of Control

The problem which confronts the manufacturer is a difficult one, as it may depend on the existence of breeding-grounds over which he exercises no control, apart from his possible disregard of those actually on his premises. These breeding-grounds may consist of rubbish tips, open middens, ash pits or dustbins, fresh manure heaps, stables, slum dwellings, poultry houses, fermenting vegetable refuse, waste-paper dumps, etc. If nothing of this sort is in the neighbourhood, the breeding-ground may be scattered, and may be reduced by adopting covered dustbins for refuse or by burning it, where it cannot be used for war purposes. Refuse dumps may be sterilised with chloride of lime or kerosene, but if the manure heaps are wanted for agricultural purposes some less harmful antiseptic like iron sulphate should be used. Fresh manure can be periodically forked over to destroy the fly maggots from the surface in the central heat.

Another precaution which should be taken is the elimination of suitable hibernating quarters for the winter, which are looked for by the flies as autumn approaches. Such hibernating places are warm cracks behind boilers and hot-water pipes, cracked plaster on walls, worn skirting boards and such like.

St. Mark's Fly

Somewhere about the month of June factory windows may often be seen to be covered with small flies other than house-flies. These appear in clouds, and the use of anti-blast window netting applied with a fish glue appears to attract them. These are the little black St. Mark's fly, or window fly, so named from its appearance around St. Mark's Day; but their swarming is often due to heat-waves making breeding conditions ideal. Another cause of these window swarms of small "flies" is a species of *Braconid* (Ichneumon fly) called *Aphidius granarius*, which is a parasite upon the green-fly, or garden aphis, and sometimes appears even in the heart of cities in the height of summer when aphids are swarming in suburban gardens. A few years ago the author examined swarms of these Braconids, erroneously called flies, which had appeared one June afternoon in great numbers in buildings in the centre of Liverpool. The swarming of green-flies is due to a biological cause, when parthenogenesis enables them to multiply with extraordinary rapidity, females producing generations of offspring without the appearance of males until winter approaches.

Natural Enemies

The natural enemies of the fly, while helping, no doubt, in keeping down its numbers, cannot be enlisted by the manufacturer in his campaign against it. Wasps are great enemies of flies, but it would not do for a jam manufacturer to encourage them from this standpoint. There is a metallic brassy-green Chalcid fly called *Nasonia brevicornis*, which lays its eggs in the pupæ of house-flies, but would lend itself to artificial development only in a nation-wide campaign against the fly. Incidentally, there is a fly fungus, *Empusa muscæ*, which grows in the body of the hibernating fly and probably kills as many insects indoors as the frost kills outdoors. Traps of many kinds have been invented for destroying adult house-flies; they vary from flypapers with contact poisons, which are very effective providing they are renewed at regular intervals, to lures in the way of attractive foods inside fine net traps, and other devices which are merely alleviative measures of no permanent value.

Control by Colour

The use of colour to control flies is a comparatively recent method based upon some very obvious biological considerations. A soft lemon-yellow is a warning colour that repels flies from rooms when window glass, distemper or wall wash is tinted in this shade, although not the same success is obtained with other yellows, or when odours have a greater attraction. In Nature the chief enemy of the house-fly is the wasp, which is very predatory upon such insects. The conspicuous yellow stripes of the wasp apparently have a warning effect upon the house-fly, which would explain the avoidance of such colours. A blue wash also seems to have a similar effect in reducing their numbers; it has been used with success in the Dutch Government to rid their stables of house-flies. Among many lower animals there appears to be a phototropic response negative to blue light, and this may be an explanation. On the other hand, white has a definitely positive phototropic effect upon many insects, including house-flies. The common use of whitewash upon walls and ceilings is the cause of much of the congregation of flies in late summer, and anything like this should be avoided where flies are troublesome. Colours which repel flies are blue, pale violet, dark brown or lemon yellow; colours which attract them are white, azure, rose, red, clear green and clear yellow. Most insects avoid the deeper shades of red and the ultra-violet end of the spectrum.

THE COCOA AND CHOCOLATE WAR-TIME ASSOCIATION

THE Constitution of the Governing Body of the Cocoa and Chocolate (War-Time) Association, together with the Executive Committee and the Sub-Committees which have now been set up, are given below:

(1) The Governing Body

GROUP A.
Mr. G. J. Harris (Rowntree and Co., Ltd.), (Chairman).
Mr. P. S. Cadbury (Cadbury Bros., Ltd.).
Mr. Egbert Cadbury (J. S. Fry and Sons, Ltd.).
Mr. C. T. Yoxall (Nestlé's Milk Products, Ltd.).
Sir Francis Terry (Joseph Terry and Sons, Ltd.).

GROUP B.
Mr. E. D. Mackintosh (John Mackintosh and Sons, Ltd.) (Caley Branch).
Mr. L. Broad (Charles Bond, Ltd.).

GROUP C.
Mr. I. G. Lennox (English and Scottish Joint Co-operative Wholesale Society Ltd.).

GROUP D.
Mr. L. H. Atwell (Lesme, Ltd.).

GROUP E.
Mr. J. B. de J. Cleyndert (British Cocoa Mills [Hull], Ltd.).

GROUP F.
Mr. R. J. Langmaid (G. F. Lovell and Co., Ltd.).
Mr. L. H. Roberts (Meltis, Ltd.).

GROUP G.

Messrs. J. T. Corbett and W. Wallace (Ministry of Food).

Committee and Sub-Committees

(2) EXECUTIVE COMMITTEE.—Sir Francis Terry, Messrs. P. S. Cadbury, G. J. Harris, E. D. Mackintosh, L. Broad, J. G. Lennox; J. T. Corbett and W. Wallace (Ministry of Food).

(3) SUPPLY SUB-COMMITTEE.—Messrs. E. D. Mackintosh, H. Giles (Rowntree and Co., Ltd.), W. M. Hood (Cadbury Bros., Ltd.), Victor Joseph (J. Lyons and Co., Ltd.); with Mr. R. S. Worth (Nestlé's Milk Products, Ltd.), co-opted for milk matters.

(This Committee meets with the Supply Sub-Committee of Sugar Confectionery Association as a Joint Supply Committee.)

(4) COCOA SUB-COMMITTEE.—The members of the Supply Sub-Committee, with the addition of Messrs. R. H. Percy (J. Lyons and Co., Ltd.), M. A. Mayes (Nestlé's Milk Products, Ltd.), C. C. Lidgett (C.W.S.), E. Chambers (Joseph Terry and Sons, Ltd.), with Mr. J. B. de J. Cleyndert, co-opted for Cocoa-Butter matters.

(5) DISTRIBUTION SUB-COMMITTEE.—Messrs. L. Broad, W. G. Dickinson (Rowntree and Co., Ltd.), W. E. Wheatley (J. S. Fry and Sons, Ltd.), and J. R. Crawford (A. J. Caley, Ltd.).

(This Sub-Committee meets with the Sub-Committee of the Sugar Confectionery Association as a Joint Distribution Committee.)

(6) PRICE CONTROL SUB-COMMITTEE.—Messrs. F. Spink (Rowntree and Co., Ltd.), R. R. Sly and S. J. Smith (Cadbury Bros., Ltd.), E. R. Dodd (Joseph Terry and Sons, Ltd.), J. H. Guy (A. J. Caley, Ltd.), with Mr. R. J. Langmaid, co-opted for consideration of cheaper assortments.

(7) TRANSPORT SUB-COMMITTEE.—Messrs. G. Cadbury (Cadbury Bros., Ltd.), E. G. Rayson (Rowntree and Co., Ltd.), W. H. Gaunt (J. Lyons and Co., Ltd.), H. H. Webb (Barker and Dobson, Ltd.), W. A. Shepherd (Nestlé's Milk Products, Ltd.), S. Macadam (Cadbury Bros., Ltd.), H. T. Williams (Cadbury Bros., Ltd.), and J. W. Price (Meredith and Drew, Ltd.).

(This Sub-Committee meets with the Sub-Committee of the Sugar Confectionery Association as a Joint Transport Committee.)

The Secretary of the Association is Mr. A. Whittaker, and Messrs. W. L. Grimble and J. H. Bayfield are Assistant Secretaries. Mr. Bayfield acts as Secretary of the Joint Supply Committee and the Cocoa Sub-Committee.

LETTER TO THE EDITOR

CANNED FRESHWATER FISH

TO THE EDITOR OF FOOD MANUFACTURE

DEAR SIR,—An article in your issue for July 1, 1941, on the subject of freshwater fish, has been drawn to my notice. In it you refer to the canning of perch from Windermere by the British Fish Canners, Ltd., of Leeds, as a result of a new fishery with traps which this Association has started this year. I may say that there is considerable opportunity for expanding this industry in future years to a number of other lakes where, like Windermere, there are so many perch that they would be serving a better purpose in tins than in the water.

You also mention the possibility of canning eels, and, therefore, you may like to know that recently a sample of eels was sent from Windermere to Mr. C. W. Banks, of the British Fish Canners, Ltd., and they came back a day or so later nicely packed in tins. They were pronounced by people who tried them as a most delectable form of canned fish, and it is hoped that the canning of eels in this country may be taken up commercially, as soon as bigger supplies of this fish can be made available.

Yours faithfully,
E. B. WORTHINGTON,
Director,
Freshwater Biological Association,
Westmorland.

VITAMIN D IN FISH OILS*

Basil E. Bailey and Kenwood Green.

Pacific Fisheries Experimental Station, Prince Rupert, B.C.

IT is well known that there are several kinds of vitamin D, differing in their antirachitic activity. Not only do at least two different modifications of the vitamin occur in fish oils, but each of these can exist free or in chemical combination with other constituents of the oils. Fats and fatty oils themselves consist of glycerine chemically combined with fatty acids; and the combined form in which vitamin D commonly occurs is a similar union with fatty acid, the vitamin taking a position corresponding to that of the glycerine in fats. The free vitamin is that which is uncombined with fatty acid.

Vitamin A can, similarly, exist in both the free and combined forms. It is known that a considerable part of both the vitamin A and the vitamin D in cod and other fish liver oils is in this combined state, chemically known as an ester, and furthermore that the ester form of vitamin A is considerably more active than the free form in curing animals suffering from vitamin A deficiency.

Conversion of vitamin D ester to the free vitamin takes place during complete saponification of the oil, a process which consists in conversion of the oil to a soap by treatment with a caustic alkali, and which is sometimes used in the preparation of commercial vitamin concentrates. Hence it is of importance that information should be available respecting the antirachitic activities of vitamin D in the thus freed state as compared with the naturally combined or ester form. A study of the relative antirachitic activities of free and combined vitamin D is therefore now in progress.

In the laboratory the oils under investigation were thoroughly saponified in order to ensure complete conversion of the combined vitamin D to the free form. The vitamin was extracted from the resulting soap solutions and dissolved in a vitamin D-free vegetable oil. These preparations and the original oils were fed to albino rats in equivalent doses, according to the regular vitamin D test procedure.

The results varied markedly with different oils, but in all cases the saponified material was at least equal in vitamin D potency to an equivalent quantity of the original oil, and in some cases it was markedly higher. Five samples of halibut liver oil, one sample of swordfish liver oil and one sample of albacore liver oil all showed essentially the same activities in the saponified form as in the original oils. One sample each of ling cod liver oil, pilchard oil (oil from whole fish), bluefin tuna liver oil and striped tuna liver oil showed greater activity after saponification than before, the results being as follows:

Oil.	*Vitamin D Potency of Original Oil.*	*Equivalent Potency of Free Vitamin D.*
Ling cod liver ...	2,300 I.U.	4,600 I.U.
Pilchard	41 I.U.	64 I.U.
Bluefin tuna liver	27,200 I.U.	46,300 I.U.
Striped tuna liver	29,600 I.U.	41,800 I.U.

I.U. = International units of vitamin D per gram of oil.

These data indicate that the free form of vitamin D from some fish oils is antirachitically more active with rats than is the naturally occurring ester. The fact that some oils showed considerably higher vitamin D activity after saponification than before, while others showed no essential difference, suggests that in some of the oils most of the vitamin D was in the ester form, while in others it was largely already in the free form, so that it underwent no further change when the oil was saponified. This may be a natural characteristic of different oils, but it is also quite possibly dependent on such factors as the length of time which the livers are kept before processing, the conditions of storage, and the method by which the oil is extracted from the livers.

The investigation is being extended to include a study of the effects of different methods of extraction and preparation on the activity of the vitamin D in the resulting oils.

* *From Progress Report No. 47 of Pacific Biological Station and Pacific Fisheries Experimental Station.*

LIGHTING AND VENTILATION

A SYMPOSIUM

THE BLACK-OUT PROBLEM

SPECIALLY CONTRIBUTED

THE VICISSITUDES of war have considerably increased the problems of lighting and ventilation in industrial establishments and the birth of many a new idea can be ascribed to situations which are peculiar to this period.

The outstanding example is, of course, the black-out. This is a war-time imposition which should not be allowed to bring in its wake other impositions, such as reduced lighting and indifferent ventilation. In food factories hygiene is of paramount importance and there can be no hygienic conditions without the provision of good ventilation.

Electricity's Contribution

As in many other war-time situations electricity has been the means of solving most of the lighting and ventilation problems brought about by the black-out, and, although it may be that all details of electricity's contribution to the war effort will never be known, there are some electrical developments which may be usefully brought to light without helping the enemy or otherwise impeding our national cause.

The word "light" is used in this particular sense because this war, with its black-out impositions and all that they imply, has made us realise how wrong have been our previous conceptions of artificial lighting.

At the outbreak of war, when the lighting restrictions were imposed, there were some people who thought that by cutting down the amount of light in their premises, or by localising it over certain spots where work was being carried out, they might still be able to provide adequate illumination to work satisfactorily and yet have no noticeable amount of light going out through the window. It is fairly safe to say, however, that the fallacy of this theory has been generally realised and therefore, as far as interior lighting for industrial purposes is concerned, it must be presumed that the premises are completely blacked out so that there are no limitations to the amount of light that might be used inside the premises.

Good Lighting Facilitates Production

Production is of vital importance, and it has been shown by numerous experiments that good lighting is a direct aid to maximum production. On the human side, the fact that good lighting facilitates production will, to some extent, compensate for any lack of operative skill. It provides some compensation for the fact that the average of workers is necessarily increasing owing to the demands of the fighting forces on the younger generation, for scientists have proved conclusively that older eyes need more light than young ones for the same degree of vision.

Good lighting has always been recognised as a means of minimising accidents, and when one considers the position of many workers who, until a short time ago, were more familiar with the production of food in the home rather than in the factory and, therefore, not so much on their guard against dangers which experienced workers would foresee, one perceives at once how necessary is this safeguard. Few would deny that continual working under bad lighting conditions can impose a strain on workers so that they complain of tired eyes and headaches. It is not generally realised, however, to what extent this strain reacts on the whole of the nervous and physical systems and is manifest in the form of fatigue. Strain is cumulative in its effect and as soon as the longer hours of working under artificial light were introduced—especially in those factories which are blacked out by day as well as by night—troubles which were hardly worth bothering about in the past immediately assumed serious dimensions.

There is also the psychological problem brought about by the fact that some people have to go into black-out premises from the brightness of daylight. They instinctively feel the need, not merely for more artificial light, but also for light of good quality. Far more pressing is their need under these conditions than when they enter a lighted factory at night from the surrounding blackness.

Mitigating Strain

In peace-time, lighting engineers made the acquaintance of many of the problems just outlined; in war-time they are in a very accentuated form. But what has been done to mitigate the strain and fatigue due to war-time conditions?

In the first place, the part which good lighting plays in industrial production and welfare was recognised by the Government some time before war broke out, and the Fourth Report of the Departmental Committee on Lighting in Factories would, no doubt, have been made mandatory in late 1939 but for the war. For a time this development was held up, but war conditions soon made it quite clear that the recommendations contained in this report were quite inadequate to meet the new situation. Hence, the committee were summoned again for reconsideration of its previous report in the light of the more exacting conditions peculiar to the war.

The committee's findings were given in the Fifth Report, which was issued in June, 1940. Though the recommendations of these two reports are substantially the same, they differ in one important item—namely, the recommended illumination for working areas. This illumination was increased from 1 foot-candle at floor level in the Fourth Report to 6 foot-candles at 3 feet above floor level in the Fifth Report. The findings of the committee were adopted and subsequently a Government Order was issued making them compulsory.

Without entering into technical details, this is a very startling increase, which has already had a most beneficial effect on production generally and on the health of the workers.

As a result of this Government Order it became incumbent upon factory executives to put its terms into practice. But the increase or intensification of light introduces other problems such as glare, heavy shadows, heat generation and ventilation, all of which, if excessive, are also capable of creating strain, fatigue, and—through these ills—accidents. Thus it will be appreciated that the problem is not purely a quantitative one; the quality of the light and its even distribution have also to be taken into account.

As already indicated, the lighting engineer is familiar with these problems, and many can be, and have been, successfully solved by the more judicious placing of light sources and by the design and use of correct diffusing and dispersing reflectors.

Fig. 1.—Osram fluorescent tubes minimise reflected glare from wet bottles in a food factory.

(Courtesy of The General Electric Co., Ltd.)

The Fluorescent Tube

One of the most important contributions to successful industrial lighting introduced since the war began, and one which possesses characteristics that dispose of most of the problems which the black-out has accentuated, is the 5-foot fluorescent tube. It is significant of the efficiency and versatility of this fluorescent tube that it is being installed in almost every type of factory—food, engineering, clothing, textile, laundries, chemical, etc.—throughout the country.

The tube is 5 feet long and 1½ inches diameter, and though it is only rated at 80 watts it produces nearly as much light as a tungsten filament lamp of 200-watts rating. That, in itself, is rather startling, but mere economy of current or its greater illuminative property (whichever way one looks at it) are only two of its outstanding features. The generally accepted standard of comparison for artificial light colour is north-sky daylight, and the colour of the light given by the 5-foot fluorescent tube is nearer to this standard than any other high-efficiency light source. Not the least important of the tube's characteristics is that it is extremely cool burning. Cold light is still one of the dreams of scientists, and though it has not yet been realised the 5-foot tube brings that dream nearer to realisation than ever before.

Another characteristic of the tube is its low surface brightness. This means that it is almost glareless, and owing to this and the length of the tube the shadows it casts are only very faint indeed. Glaring sources of light make vision difficult and shadows so dense that often it is not easy to distinguish between shadow and solid substance, and this may lead to accidents.

This non-glaring characteristic is beneficial in other ways. The light is easier on the eyes and headaches and fatigue brought about by eyestrain are thus circumvented. Again, because the surface brightness is low and glare at a minimum, reflections from polished surfaces (*e.g.*, wet bottles being washed for the food and confectionery trades as in Fig. 1, or from rows of shining food cans in the filling and packing departments) are at a minimum. This again reduces eyestrain and its ill-effects.

When all these features are taken into consideration it is not difficult to see why the tube is providing such an effective answer to the problems which the black-out has introduced, and because these features of the tube are interrelated it is not easy to select any one as being particularly applicable to any one trade or operation. For example, the fact that it is extremely efficient means that by comparison with tungsten lamps giving a certain degree of illumination, to produce the same intensity of light, fewer tubes will be needed, and because of this, and the fact that the tube is cool burning, less heat will be generated and therefore the load on the ventilating system will be lessened.

Although the 5-foot tube is helping to reduce ventilation problems in factories, for those who are working at pressure for long periods in places where the black-out has made the normal ventilating system less efficient, it is essential that some auxiliary form of ventilation system be provided. Even in pre-war days, it must be admitted that in many establishments good ventilation was the exception and not the rule. To-day the problems of ventilation are even more urgent, for present conditions are making past omissions most obvious. In food factories, where hygiene—personal and general—is vital, efficient ventilation is imperative.

Light-Trap Devices

To comply with the lighting restrictions it has invariably been necessary to add light-trap devices to jack-roofs, obscure air inlets, and generally interfere with natural ventilation. During daylight it is possible to compensate for this restriction to the ventilation by opening doors, windows and skylights or by the provision of shuttered openings in the walls, but during the hours of darkness, when these openings must be closed, the ventilation problem is acute.

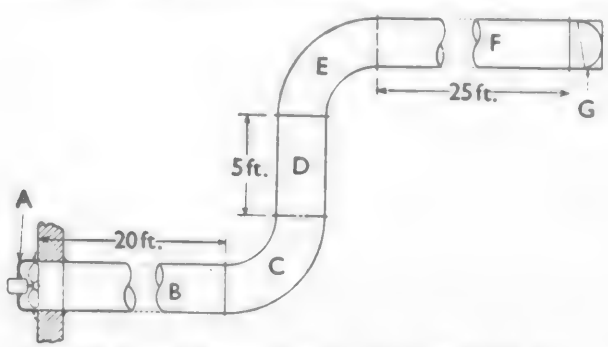


Fig. 3.—A typical Genelex duct system designed to discharge 8,300 cu. ft. of air per minute.
(Courtesy of The General Electric Co., Ltd.)

Fig. 2.—Wrapping Department of a Confectionery Works lighted by Osram fluorescent tubes.
(Courtesy of The General Electric Co., Ltd.)

The solution to the problem in factories where most of the windows and skylights are permanently screened is to employ mechanical ventilation. Indeed, the Emergency Report No. 1 of the Medical Research Council (Industrial Health Research Board) states that " in factories where ventilation has been interfered with by black-out conditions, special provision for ventilation is urgent as a preventive measure lest the efficiency and comfort of the workers become impaired ".

In factories, workshops and large commercial buildings, exhaust fans of the propeller type, if properly applied, will give not only the most satisfactory but also the cheapest form of ventilation.

One system, known as the " Genalex ", which uses exhaust fans, provides for efficient ventilation without invalidating black-out precautions. This includes a range of fans from 9-inch to 48-inch, all of which are of the variable speed type; a special air duct system and various light-proof accessories.

The factory illustrated by Fig. 2 employs about 1,000 operatives and is ventilated by means of five Genalex 36-inch, 400-r.p.m. exhaust fans each fitted with an external bend. The fans give about six changes of air per hour throughout 486,800 cu. ft. of air space. It is claimed that owing to the careful proportioning of these bends air loss is reduced to the low figure of about 10 per cent.

It will be appreciated that these bends also form effective light-traps; but should it so happen that a lighting point is situated close to and just above the fan, the light screening can be completed by fitting a low loss louvre specially designed for the purpose. For fans mounted in flat or sloping roofs there are other light-proof accessories. These fans are designed to operate against a considerable resistance to the air stream and thus, where ducting has perforce to be used, they are particularly suitable. A typical duct system designed to discharge 8,300 cu. ft. of air per minute is shown in Fig. 3.

In premises of comparatively small cubic capacity ventilation difficulties may be solved without infringing black-out regulations by a more simple and less expensive method.

This employs a small exhaust fan, the " Xpelair ". It is simple to install, it is absolutely light-proof, and its ventilating capacity is about 14,000 cu. ft. per hour. The method of mounting is either to have a circular hole of appropriate size cut in a convenient window pane, or to have the window glass removed, the fan mounted on a piece of plywood and then fixed into the window frame. The latter method has the advantage of obviating the blacking-out of surrounding glass.

In rooms where the cubic air content is greater than the fan capacity, two, three, or more fans may, of course, be installed, and since the overall dimension of the fan is only 11½ inches, this will entail a comparatively small area of permanent black-out. This is but a small price to pay for efficient ventilation.

FACTORY VENTILATION

H. C. APPLEBY

AT one time the need of efficient ventilation for factories was given very little consideration, and in many of the older factories now in use there is much room for improvement in this respect. It was not recognised that air-conditioning is necessary for the comfort and health of operatives, as well as being essential to processing of materials.

During the last two decades more attention has been given to the matter with the result that when modern factories are designed the architects generally make provision for satisfactory ventilation, either by " natural " ventilation or " mechanical " ventilation, or both.

Limits of Carbon Dioxide in Air

The air expired by human beings carries from 4 to 5 per cent. of carbon dioxide. It is considered that the average man will in one hour exhale 0·6 cubic feet of carbon dioxide, and that if he were in a gas-tight room which has a cubical capacity of one thousand cubic feet the air would be vitiated to the extent of 6 parts of carbon dioxide per ten thousand feet of air in one hour. This led to the recommendation that the carbon dioxide in room air should not be permitted to rise higher than 0·06 per cent., a figure which is certainly on the safe side. Extensive experiments on carbon dioxide contents of air in different places have been carried out with the following results :

	Per Cent.
Ben Nevis	0·0317
Thames (London)	0·0345
Haymarket Theatre, Dress Circle (at 11.30 p.m.)	0·0757
Underground Railway (mean)	0·1452
Workshops in Mines (average of 339 samples)	0·7852

It therefore follows that if the carbon dioxide in a room is kept down to 0·06 per cent. the supply of fresh air is ample. Professor Sir Leonard Hill (a well-known authority on ventilation) has shown that a man breathing air containing 2 per cent. carbon dioxide does not necessarily experience discomfort, and by using an alcohol thermometer (the Kata thermometer), which measures the cooling effect of air, it is possible to decide when the provision made for ventilation is comfortable for human beings. The term " good ventilation " is relative, but it is generally recognised that any system which ensures a sufficient supply of air, enough to maintain a cooling power of 6 Kata thermometer units while the temperature of the room is kept at 65° F., is conducive to healthy working conditions.

The latest report of the New York Commission on Ventilating recommends that the air supply to buildings shall not be less than 15 cubic feet of fresh air per person per minute, but there are no acknowledged standards in Britain for all the various conditions that exist in industrial practice, and one can only rely upon the results of past experience to decide what is the most suitable provision to make for any particular rooms, although in British practice it is generally agreed that each healthy man should receive 300 cubic feet of fresh air per hour.

Natural and Mechanical Ventilation

Ventilation is classified under two headings—" natural " and " mechanical ". The former is sometimes referred to as " automatic " ventilation and depends on difference in density of the air outside the building and of the air inside the building. This system is not extensively used in factories because there is little opportunity for control and the maintenance of various rooms.

" Mechanical ventilation ", which refers to all systems where fans are in use, is entirely satisfactory when suitable equipment is installed to meet a given set of conditions. The necessary changes of air are made by extraction or delivery fans driven by electric motors whose speed can be lowered or raised to deal with external variations of temperature. This system can also be arranged to humidify, filter, or warm the air, and therein lies its greatest advantages over the " natural " system. There are two types of fan in general use, the centrifugal fan and the propeller fan. Propeller fans are suitable for dealing with large volumes of air against small resistance ($\frac{3}{16}$-in. water gauge), and centrifugal fans are used for resistances up to 28-in. water gauge. The centrifugal type, though more costly than the propeller fan for equal duties, is more efficient, size for size (comparing its outlet with the diameter of the propeller type), but if the air has to pass through long small ducts the centrifugal type should always be installed. The propeller fan provides a cheap method for moving large volumes of free air, but is not suitable for drawing or delivering air against either suction or pressure excepting when large ducts are in use.

One system of air-conditioning which is considered to be very satisfactory is that known as the " Plenum ". It provides for fresh air being passed through a filter which purifies it, a water sprayer to wash and humidify it, and air heating equipment to bring the air to the temperature required in the factory, to which it is led through a main duct extending the length of the factory, the duct decreasing in size towards the end, and providing uniform distribution of air.

Fumes and Dust

While dealing with ventilation it is also advisable to consider the need of plant to deal with dust and fumes which may be harmful to operatives and/or products. When fumes or dust from a plant are troublesome, a suitable type of exhaust fan should be used to discharge the offensive matter outside the building into a suitable container in the case of solids, or, where vapours are being dealt with, into some form of condenser. Great care should be taken in the building of the ducts carrying the discharge from the fan. These should be made of metal, particular care being taken to make the joints absolutely tight; this point should be specified in writing when the order is placed with the duct manufacturer, and may save both trouble and expense at a later date.

The ducts for propeller fans should always be equal to the area of the fan, and be so designed as to create a minimum velocity, and it is advisable to recognise that a velocity exceeding 700 ft. per minute will cause reduction of the output of the fan.

The power required to drive centrifugal and propeller fans is given below :

For a centrifugal fan :

$$\text{H.P.} = \frac{\text{C} \times \text{w.g.} \times 5{\cdot}2 \times 100}{33{\cdot}000 \times \text{E}}$$

Where C = volume in cubic feet, w.g. resistance in inches of water, and E = efficiency of the fan.

The efficiency may vary with the make of fan and with its size. The formula makes no provision for resistance of ducts.

For a propeller fan :

$$\text{H.P.} = \frac{\text{WV}^2 \times 100}{2g \times 33.000 \times \text{E}}$$

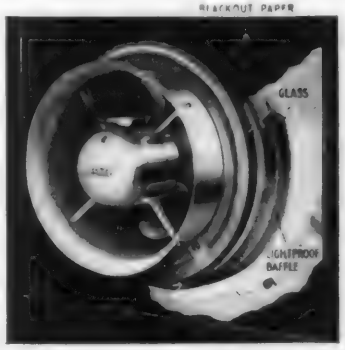
where W = weight in pounds of air moved per minute

$$\text{V} = \frac{\text{cubic feet of air per second}}{\text{area of fan (in feet)}}$$

$g = 32{\cdot}16$

E = efficiency of fan (about 35/40 per cent.)

This formula applies when the fan is working in the open and not against resistance.



A completely light-proof fan mounted in window pane.
(Courtesy of The General Electric Co., Ltd.)

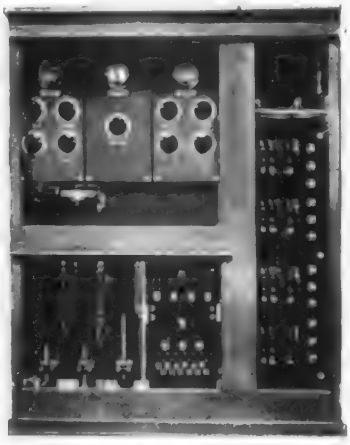
Lighting and Ventilation

Control of Lighting and Ventilating Equipment

One of the most vital necessities of lighting and ventilating equipment is the control of the motive power which drives the equipment.

The Watford Electric and Manufacturing Co., Ltd., manufactures all types of control gear for electric motors of every description. It specialises in the solution of automatic interlocking equipment, embodying all the essential safety devices necessary for the safe running of the motors.

In addition to the motor control gear itself, there is manufactured the Watford-Pigral system of automatic control, of particular interest on all temperature control and air-conditioning installations.



This temperature control system is an industrial application of resistance thermometry. The significance of this basic principle will be realised when it is explained that the temperature detectors are simply resistances which can be made as sensitive as required to changes in the temperature condition. In addition, by suitably arranging the resistances, true average temperature control of large spaces can be readily obtained.

This method also has the further advantage that the temperature detectors can be made completely safe against dust, damp, or chemical attack without in any way interfering with the sensitivity or the operation of the detectors.

Another feature of this method of control is that it enables the whole of an installation to be controlled from a central control point; temperatures within remote spaces being rapidly and easily adjusted by means of control knobs at the control point. The system, in addition, is operated on low voltage, making for very inexpensive installation and safe operation.

Embodied within this control system is a method for remote indication of the operation of the remote control throughout the building at the control panel.

Control of all forms of heating and ventilating plant is available, and, due to the versatility of the equipment, many special problems can be readily solved where normal standard equipment produces only partial or inefficient control.

A typical multi-point control panel is shown in the illustration. This is for a heating installation of several circuits; all control is from the central control panel, which, in addition, incorporates control of the heat-producing units themselves, as well as time-switch control and remote indication of the valve operation.

While the above description is mainly concerned with temperature control, equipment is available working on modifications of the system for humidity and air-condition controls generally.

* * *

Air-Conditioning

The food industry has come to regard the usefulness of modern air-conditioning with deeper interest, not only from the standpoint of producing a better class of product, but also in consideration of the health and general efficiency of the factory operatives.

The specific nature of the raw materials employed in food preparation is such that extreme care must be exercised during the various processes if the purity of the finished product is to be unquestionable.

One of the principal features of the "Sirocco" air-conditioning plant, of Davidson and Co., Limited, is the complete uniformity of each product which can be obtained during production. By careful maintenance of temperature and humidity within close limits for the processes involved, production can proceed smoothly and without regard to seasonal changes or the location of site exposure of the factory. Uniformity in the quality and appearance of the product is made possible by the automatic supply of fresh air, thoroughly cleaned of all impure substances such as dust, bacteria, moulds or soluble gases, and delivered throughout the premises at the required temperature and relative humidity. This advantage enables the factory management to straighten out summer and winter production curves and plan the output of the factory in advance irrespective of external atmospheric changes, thereby maintaining delivery schedules.

By increased production over the same floor area the necessity of factory expansion is avoided, while there is an appreciable saving in the maintenance of automatic machinery due to the absence of abrasive dust in the air.

Practically every branch of the food industry can be with advantage serviced by "Sirocco" air-conditioning plant, and it is especially useful in those producing bacon, biscuits, bread, cereal foods, cheese, confectionery, egg products, dried fish and fruit, canned fish, fruit, meat, milk, vegetables, and also in the refining of sugar.

The storage of the various materials and ingredients is also a problem readily solved by air-conditioning plant, especially the storage of meat. Dry materials such as flour, salt, and sugar may be kept indefinitely in rooms which have plenty of daylight, at temperatures around 70° to 80° F., with good air circulation and low relative humidity. Syrup, shortening, and eggs may be kept at the optimum temperature of 45° to 50° F., while yeast is safely stored at 40° to 50° F. with fairly low relative humidity.

"Sirocco" Air-Conditioning Equipment in Food Factory.

* * *

Milk Marketing Board Headquarters

The headquarters of the Milk Marketing Board, which functions under the ægis of the Ministry of Agriculture and Fisheries to ensure the uniform distribution of milk throughout the country, is situated in rural surroundings to the west of London.

The importance of the service the Board is discharging is reflected in the building which houses those concerned in its administrative purpose—a building standing in a site embracing some seventeen acres. Architecturally it is as imposing as it is extensive, but at the same time its utilitarian end has been kept prominently in view, and the staff of approximately one thousand is finding the provisions made have greatly facilitated the performance of the administrative work.

The electrical equipment of the building is in accordance with the vision shown in other directions, recourse being made to electrical service for a wide variety of requirements. Actually the normal demand for the premises is in the order of 450 kilowatts and it is taken from the London and Home Counties mains at a pressure of 400/230 volts.

The lighting generally is designed to give ample illumination for efficient working, the intensities varying with the duties of each department, and is based upon modern practices.

NEWS FROM THE INDUSTRY

MINISTRY OF FOOD

Lord Horder—Food Adviser

The Minister of Food has appointed Lord Horder to be his personal adviser on medical aspects of food problems.

* * *

Licensing of Biscuit, Rusk and Crispbread Manufacturers

The Minister of Food has made an Order—the Biscuits (Licensing and Control) Order, 1941—which provides that from August 4, 1941, no person or undertaking shall engage in the manufacture of biscuits, rusks or crispbreads, as defined by the Order, unless licensed by the Ministry.

"Biscuits" are defined in the Order as including biscuits wholly or partially covered with chocolate, wafers, rusks, crispbreads, oatcakes and matzos, but not including medicinal biscuits (other than diabetic biscuits) or biscuits used for feeding to animals, or dried bread used in making sausage meat, meat roll or other similar products.

Manufacturers who produced any of these products during the year 1940, but whose output in that year did not exceed 12 tons, are excluded from the scope of the Order until their output reaches that amount in the twelve months, beginning from the date on which the Order comes into force, or in any succeeding period of twelve months.

Any manufacturer who wishes to obtain a licence should write immediately to the Ministry of Food, Cake and Biscuit Branch, Westfield, Colwyn Bay, Denbighshire. The application should state whether the output during the year 1940 exceeded 12 tons, and the full addresses of all premises in which manufacturing is carried on should be specified.

* * *

Canned Fish—Licensing of Canners and Wholesalers

From September 1, 1941, the canning of fish and the sale by wholesale of canned fish is prohibited except under a licence granted by the Minister of Food in respect of Great Britain or by the Ministry of Agriculture for Northern Ireland in respect of Northern Ireland.

Sale by wholesale means a sale to a person buying for the purpose of resale but does not include a sale to a person buying for the purpose of a catering business carried on by him.

* * *

New Deputy Director of Meat and Livestock

The Minister of Food has appointed Mr. J. C. Kidd, F.A.I., to be Deputy Director of Meat and Livestock. Mr. Kidd, since the beginning of meat and livestock control has been Area Meat and Livestock Officer for the North-Western Area. Mr. K. G. M. Harding, Deputy Area Meat and Livestock Officer for the North-Western Area, has been appointed Area Meat and Livestock Officer (North-Western Area) in place of Mr. Kidd.

Wholesale Food Trade Adviser

Lord Woolton has appointed Mr. O. E. Davies to be Wholesale Trade Adviser to the Ministry of Food. Mr. Davies will be attached to headquarters of the Ministry, and will deal with problems arising out of wholesale distribution.

He has been serving as Chairman of the South-Western Area Provisions and Groceries Committee and as a member of the Bristol Port Emergency Committee.

He is ex-President of the Bristol and West of England Wholesale Provision Trade Association, and was recently elected Vice-Chairman of the National Committee of the Wholesale Provision Trade and a member of the Co-ordinating Committee of the Provision Exchange of the United Kingdom.

* * *

Control of Factory and Storage Premises

Four new appointments have been made by the Ministries of Supply and Food in connection with their storage programmes and by the Board of Trade in connection with the work of the Control of Factory and Storage Premises.

Mr. T. Muir Wilson, formerly Regional Controller of Factory and Storage Premises under the Board of Trade for the Northern Region, has been transferred to the Ministry of Supply as from August 1.

Capt. S. N. Whibley, formerly Regional Controller of Factory and Storage Premises under the Board of Trade for the Eastern Region, has been appointed Director of Warehousing at the Ministry of Food.

Mr. S. A. Sadler Forster, formerly Regional Co-ordinator at the headquarters of the Control of Factory and Storage Premises, Board of Trade, has been appointed Regional Controller of Factory and Storage Premises, Board of Trade, in the Eastern Region.

Viscount Templetown has been appointed Regional Controller of Factory and Storage Premises, Board of Trade, in the Northern Region.

* * *

Sale of Shredded Beef Suet

The Ministry of Food has made an Order removing shredded beef suet from the scope of the Food (Current Prices) Order, 1941. The sale of shredded beef suet is now governed by an agreement with each manufacturer, which contains the following provisions, amongst others. The containers of shredded beef suet packed for retail sale must be marked with the retail prices approved by the Ministry. These prices are, in case of brands, those prevailing during January to June, 1940; in the case of unbranded suet and suet sold in bulk, the retail price must not exceed tenpence per pound. The proportion of the cheaper kinds of suet sold by each manufacturer in each period of six months must not fall below the proportion sold in January to June, 1940. The Order is already in force.

Mr. D. R. Serpell

The Parliamentary Secretary to the Ministry of Food, Major Gwilym Lloyd George, M.P., has appointed Mr. D. R. Serpell to be his Private Secretary.

* * *

Processed Eggs for Caterers and Manufacturers

The Ministry of Food announced recently that it is hoped shortly to distribute supplies of processed eggs to the catering and manufacturing trades in place of eggs in shell which are no longer available to them. Discussions are in progress with caterers and manufacturers to decide the basis of distribution.

Sir James Calder

The Minister of Supply, Lord Beaverbrook, has appointed Sir James Calder, C.B.E., Adviser on Home Timber Production, to the Raw Materials Branch of the Ministry of Supply, and has appointed Mr. G. Lenanton to succeed Sir James as Director of Home Timber Production.

* * *

Concentration of Tinplate Industry

The Minister of Supply has appointed the following as a Committee to consider and report on the application to the tinplate industry of the policy of Concentration of Industry, having regard to the measure of redundant plant existing in the industry:

The Right Hon. the Lord Essendon, J.P., Chairman; Captain H. Leighton Davies, C.B.E., J.P. (Chairman of the Tinplate Conference); Mr. J. E. James (Messrs. Richard Thomas and Co., Ltd.); Major Llewellyn David (Messrs. D. R. David and Co.); Mr. John Brown (Iron and Steel Trades Confederation); Mr. P. Owen (Transport and General Workers' Union); and Mr. R. G. Lewis (National Union of General and Municipal Workers).

Mr. J. C. Carr, Raw Materials Department, Ministry of Supply, The Castle, Warwick, will act as Secretary to the Committee.

* * *

Agricultural Education

After consultation with the President of the Board of Education, Mr. R. S. Hudson, Minister of Agriculture, has appointed a Committee under the chairmanship of Lord Justice Luxmoore to examine the present system of agricultural education and to make recommendations for improving and developing it after the war.

The other members of the Committee are:

Mr. H. Beaumont, M.P.
Mr. W. J. Cumber.
Mr. Ifor L. Evans.
Mr. W. M. Goodenough.
Dr. T. Loveday.
Mr. J. M. McClean.

Mr. A. R. Whyte, Ministry of Agriculture, and Mr. Ronald Ede, have been appointed to be Joint Secretaries to the Committee. Dr. G. K. Sutherland, of the Board of Education, will act as Assessor.

U.S.A. Standards for Margarine

The definition and standard of identity for oleomargarine, based on findings of fact from public hearings and published recently in a proposed order by the Food and Drug Administration of the Federal Security Agency, has been promulgated by the administration, to become effective within ninety days from its official publication on June 5.

Oleomargarine may contain, under the definition and standard, rendered fat, oil, or stearine from cattle, sheep, swine, or goats; any vegetable food fat or oil; any combination of above (in certain proportions); milk, skim milk, cream or dried skim milk and water; artificial colouring; sodium benzoate or benzoic acid; vitamin A as a fish liver oil or a concentrate; artificial flavouring diacetyl; lecithin, butter, and salt.

Finished oleomargarine must contain not less than 80 per cent. fat. The new ruling also specifies labelling practices to be observed. Where oil is used, the word "oil" may be substituted for "fat" in the label statement. In lieu of the word "animal" or "vegetable" in any such statement, the common or usual name of the fat ingredient may be used.

* * *

Tinplate for Canning

Though the successive imposition of official restriction measures has meant a considerable contraction in the total output of the tinplate industry as a whole, manufacturers at the moment are generally fairly well occupied on orders in connection with the canning of this year's fruit and vegetable crops.

Canning of vegetables alone will need some 50,000 tons of tinplates, involving about 1,000,000 basis boxes, while the quantity required for the canning of jams is also expected to be substantial.

Bottling of certain fruits and vegetables, too, will call for a useful amount to manufacture the metal tops for the bottles.

* * *

Meat and Butter from New Zealand

Mr. J. G. Barclay, Minister of Marketing and Agriculture, announced that since the outbreak of war New Zealand has shipped to Britain 254,000 tons of butter, 210,000 tons of cheese, and 598,000 tons of meat.

In addition, she has sold to Britain 1,600,000 bales of wool.

Various secondary industries, with contracts valued at £1,000,000, are also producing food for Britain.

Mr. Barclay paid a tribute to the farmers' response to the call for increased production, and said the new system of water-front work had considerably speeded up the handling of ships.

* * *

Food Poisoning Among Ministry Staffs

A number of the staff of the Ministry of Transport and the Ministry of Economic Warfare at Berkeley Square House were taken ill recently, with symptoms indicating some form of food poisoning. About sixty cases were immediately taken to hospital, where fifty-six have been detained. An investigation is being held.

Whale Meat in Cans

Canning of whale meat constitutes a new industry being developed in Newfoundland. The meat, described as tender and tasty, is considered a delicacy. It has long been recognised as a food, but has not previously been accepted for general consumption in North America except by the Eskimos. Canning of seal meat is also steadily on the increase.

* * *

Eggs from Chicago

A Reuter message from Chicago says some 26,000 dozen eggs have been bought by the Department of Agriculture for shipment to Britain. In order to reduce shipping weight and space to the minimum, the eggs will be broken, the yolks and whites removed and then put together again after going through a process that reduces them to a fine powder. None of the edible or nutritional qualities is lost in the process. The eggs merely lose their shells and moisture.

* * *

Portuguese Sardines for Britain

A contract was recently signed between the United Kingdom Commercial Corporation and the Portuguese packing industry and merchants, by which Great Britain will buy this year and ship 1,500,000 cases of sardines, at a cost of £2,800,000. Each case holds 100 tins.

This deal covers 150,000,000 tins, certainly as much as can be packed this season by the whole Portuguese canning industry. The necessary tinplate is being supplied from England.

This agreement relieves the very difficult position of one of the Portuguese staple industries.

* * *

Taring Scales

Mr. A. H. Hewitt, maker of taring scales, advises that he is very busy, but that he is able to get deliveries out in about four weeks.

It may be interesting for food manufacturers to know that no food licence is required for any taring scale up to 60 lb. capacity. For scales over 60 lb. a licence from the Board of Trade is necessary.

* * *

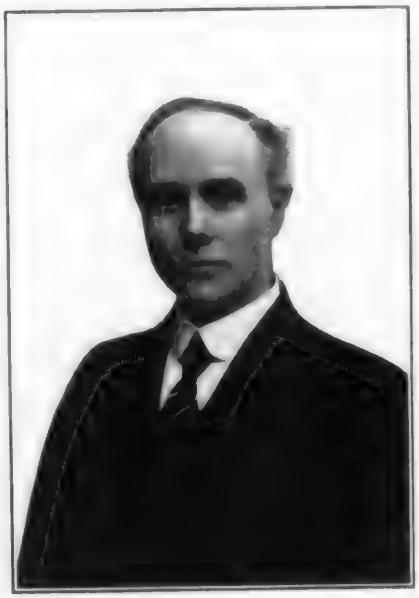
Food from Argentina

At a meeting of the Council of the British Community in Argentina recently, a resolution was approved whereby the community would undertake to feed 20,000, or one-third of the total, of the British prisoners of war in Germany. The cost, which will be borne by the community as a gift, is about £30,000 a month. Four hundred tons of food will be sent monthly to Lisbon in place of supplies formerly sent by the United Kingdom.

To raise the necessary funds the Council contemplate asking the community to increase substantially the existing voluntary income tax.

At the suggestion of the Ambassador, Sir Esmond Ovey, the Council of the British Community has unanimously resolved to present a Spitfire to Mr. Churchill as a gift for his next birthday.

OBITUARY



Mr. Herbert A. Manger

We regret to announce the death at sixty-two of Mr. Herbert A. Manger, Chairman and Managing Director of J. Manger and Son, Ltd., whose work has brought such great progression and expansion to that business and its five subsidiary companies, Manger's Salt Works, Ltd.; Agden Salt Works, Ltd.; Alfred J. Thompson, Ltd.; the Shaka Salt and Chemical Co., Ltd.; and Manger's Garages, Ltd.

His enterprise has led to increasing strength among these companies and the seven works involved, thereby considerably extending the organisation founded by his grandfather in 1849.

Highly esteemed in the trade for his expert knowledge, he was a member of the executive of the British Salt Federation. A Freemason, he was also a member of the Basket Makers' Company.

He represented the Stamford Hill Ward on the Hackney Borough Council from 1912 to 1920, when he retired owing to pressure of business.

He leaves a widow but no family, and he will be greatly missed by all who had association with him.

* * *

Mr. William Boyd, LL.D.

The death has occurred at Dundee, after a brief illness, of Mr. William Boyd, LL.D., who was for many years managing director of Messrs. James Keiller and Son, Ltd., preserve manufacturers and wholesale confectioners, Dundee.

A native of Dundee, Mr. Boyd was 68 years of age, and a son of the late Mr. James Boyd, a former chairman of Messrs. Keiller. He spent his early years in London, his father having gone there to take charge of a new factory which the firm had erected in Silvertown. He retired from business in 1920, when Messrs. Keiller became an associated company of Crosse and Blackwell, Ltd.

Tea Quota Increase

In view of the increasing demand from all consuming countries, the International Tea Committee have decided to increase the quota for the current year of regulation from 95 per cent. to 100 per cent.

* * *

Manx Meat Imports

For the first time since the war began, meat is being imported into the Isle of Man because of an acute shortage in the island's beef and lamb supplies.

* * *

Profitable Rabbits

Market Rasen (Lincs.) School Rabbit Keeping Club has paid out to its members 9d. for every 6d. they invested when the Club was started a year ago —a dividend of 150 per cent. It was estimated that six breeding rabbits would produce 300 lb. of meat in a year, and this proved correct. The rabbits have been fed almost entirely on waste.

* * *

Peace-Time Control

The Executive Committee of the Liberal National Council recently passed a resolution expressing concern at "the increasing tendency in certain quarters to insist that the methods of war-time control must be in a large and undefined measure continued in peace-time". The resolution stresses that while the motive of service must be primarily stimulative of human activity, the Liberal faith is one which is concerned with the preservation and encouragement of private enterprise. The prospect of individual reward, with its attendant risk of individual loss, is an essential factor governing efficiency, initiative, the avoidance of waste, and progress in production, trade and commerce.

* * *

Mobile Canning Units for Scotland

Five mobile canning units to can surplus fruits and vegetables in the various Scottish producing areas have now been put on the roads. They have been given by the American Federation of Business and Professional Women to their allied club in this country and have been lent to the Women's Institutes' National Federation. They will tour various parts of the country canning the vegetable and fruit produce of the different localities in England and Scotland. One will operate in the West Scotland area under the control of the Glasgow and West of Scotland College of Domestic Science, which has been taking a prominent part in food production and conservation in the Glasgow area.

* * *

Canning Unit for Yorkshire

Yorkshire is to have the use of one of the five mobile fruit-canning units, presented by the American Federation of Business and Professional Women, which will be operated by the Women's Institutes.

Offer of Cheese-Making Plant

Brigadier-General E. M. P. Stewart, proprietor of the Island of Coll, has offered the Milk Marketing Board the farm of Arinagour, one of the largest on the island, to be converted into a creamery for Coll.

He has also offered the entire cheese-making plant and equipment, farm and plant being rent free for a year. The offer is made in a last effort to save the centuries-old cheese-making industry for which the island is famous.

* * *

Food Machinery and Chemical Plant Export Group

This group advises change of address and telephone number as follows: 39, St. James's Street, London, S.W.1. Tel.: REGent 3474.

The group comprises the following sub-groups:

Bakery and Biscuit Plant Export Group.

Brewing and Mineral Water Machinery and Allied Plant Export Group.

Chemical Plant Export Group.

Chocolate and Sugar Confectionery Machinery Export Group.

Dairy Equipment Export Group.

Food Machinery and Chemical Plant (Misc.) Export Group.

Paint, Ink and Allied Trades Machinery Export Group.

Director and Secretary, Norman Neville.

* * *

Meat and Poison Gas

A special appeal to butchers to volunteer for training to deal with foodstuffs contaminated by persistent gas was made by Mr. F. Lloyd, of the Medical Officer of Health's Department, at a special meeting of the Portsmouth Association.

Mr. Lloyd stated that since the capitulation of France the Germans had moved into the occupied territory large quantities of mustard gas bombs, and it was just as well to be prepared. There were two kinds of gas against which adequate precautions had to be made, the arsenical gases and the blister gases, but mustard gas was the one which it was thought the enemy might be tempted to employ. That would affect food as well as human beings. Two sites had been earmarked, away from dwellings, for dealing with any contaminated foodstuffs, and the method of treatment would be by airing, for foodstuffs which were only contaminated by vapour, and trimming for articles which had received direct liquid contamination. The trimmings would be disposed of by burial or burning. The difficulty in which the local authority found themselves was shortage of man-power, and although they were willing to do everything they could to help the food distribution trades, should foodstuffs become contaminated, they had not enough men to tackle the job. It was felt men might be spared for one, two, or perhaps three days after a raid, to deal with the trimming and handling of meat, and the Corporation would pay them for their work at the rate of 12s. per day, or £8 10s. per week.

Carsons Pay 12½ Per Cent. Deferred Shares

Carsons, the manufacturers of confectionery, have declared a dividend of 12½ per cent. on the deferred shares, upon which nothing has been paid for many years. The denomination of the shares, 4s., dates back to March, 1933, when 16s. was written off each £1 share. The company is controlled by H. J. Packer and Co.

* * *

Vinegar Appeal Fails

The appeals committee of the Breconshire Quarter Sessions has dismissed with costs an appeal at Brecon against the decision of the Brynmawr justices on June 9, convicting the Meadow Dairy Company, Ltd., Brynmawr, for selling pure vinegar not of the nature, substance, or quality of the article demanded. A fine of £5 was then imposed.

* * *

Dehydrated Potato Cubes for Hash Canners

Canners of corned beef hash have been showing interest lately in the use of dehydrated potato cubes instead of unloading potatoes and peeling them. Cubes are made from Idaho potatoes, washed, peeled, cubed, blanched, and dried. Some 10 lb. of potatoes are required to make 1 lb. of cubes. After soaking, a pound of cubes weighs 5½ lb. Colour and flavour are identical with freshly peeled potatoes.

* * *

Decontamination of Foodstuffs

A very useful little booklet with the above title, by Frederick Caddick, M.S.I.A., L.A.R.P., has recently been published, price 1s.

Arranged in tabular form, it is designed to show at a glance the appropriate action to be taken when food is affected by a particular gas or group of gases. At the head of each table is stated the effects that would follow if people ate food affected by the gas.

There is also an appendix showing what precautions should be taken in food factories, warehouses and shops to prevent food becoming contaminated.

It should certainly be on the desks of all Food Executives.

* * *

Traders' Difficulties

Sir Andrew Duncan said recently to a deputation of members of the 1922 (Conservative Members) Committee who met him to express their concern with the difficulties of small traders and small manufacturers, that he was fully alive to these difficulties. He gave an assurance that multiple shops and large stores were receiving no preferential treatment in any arrangements over which the Board of Trade can exercise control. He referred to the Craig-Henderson Commission set up to examine the position of the retail trade under war-time conditions. He promised to keep the whole position of small traders under his personal observation.

COMPANIES

Metal Box Profits

A further increase in the gross earnings of the Metal Box Co. for the year to March 31 has been much more than offset by a steep rise in the taxation charge. Trading profits, struck after providing for premiums under the War Damage Act and E.P.T., were down from £609,375 to £575,285. As £345,000, against £278,500, was provided for income tax, the net balance was only £199,705, against £303,996. For the fourth successive year Ordinary stockholders get a final dividend of 10 per cent., plus a 2½ per cent. cash bonus, which brings up the total distribution to 17½ per cent. This leaves £141,446 to go forward, against £117,403 brought in.

In the consolidated balance sheet the larger scale of activities is indicated in a rise in stocks on hand from £2,496,629 to £3,073,718 and by similar increases in the debtors and creditors items. There is still an excess of current assets over current liabilities of £2,162,328, these funds being actively employed in the business.

* * *

Van den Berghs

Van den Berghs and Jurgens is a subsidiary of Lever Bros. and Unilever concerned with the production of margarine and cooking fats. As such its business has been largely subject to official control, and its products have been marketed through the national agency of Marcom. These products, whose dietetic value has received increased prominence owing to war-time conditions, have obtained a more widespread sale, and despite rationing the volume has been well maintained judging by the company's profits of £1,558,800. The advance of £30,000 odd is offset by a similar increase in the tax charge of £492,900, but in that connection it is intimated that Lever Bros. and Unilever has undertaken to assume liability for E.P.T. in excess of N.D.C. up to the end of 1940.

It is obvious that the tax provision does not cover the liability for income-tax on the profits of the year. To meet that the profits have been charged with a further £250,000 as a reserve, which has been augmented by sums from other reserves no longer required. Profits available for dividend are consequently reduced; hence the cut in the tax-free Ordinary dividend from 12½ to 10 per cent. Marcom, as a joint organisation of the industry, has been financed by the individual companies. Van den Berghs' participation and amounts outstanding with the Ministry of Food largely account for a big increase in debtors and decrease in the amount deposited with the controlling company.

(*Financial Times.*)

* * *

Energen Foods Co., Ltd.

In the fifteenth annual report of the company, it is stated that the output of the company, including wheat starch and wheat gluten produced by the subsidiary has been increased by the installation of new plant in order principally to meet the demand for Energen Foods, but also to supply the raw material for food manufacturers generally, who are making increasing use of this valuable source of protein. The production of starch has also been on the highest level.

The distribution of Energen Foods has been facilitated by the establishment of eight depots throughout the country, as well as by the stocks carried by wholesalers. While there has been some difficulty in meeting the demand for cereals and Energen Fruit Products, on the whole consumers have been able to obtain their requirements without difficulty.

In addition to the depots, storage accommodation has been provided for raw material in various localities, and additional premises have been acquired to meet possible manufacturing difficulties, as well as for storage purposes.

In view of the circumstances of the present time, the Directors are taking steps to negotiate arrangements for the production and distribution of Energen Foods in the United States of America, and discussions are now proceeding with important undertakings in that country.

* * *

Montgomerie and Co.

The directors still do not consider it advisable to submit completed accounts for the year ended April 30, 1941, pending the conclusion of negotiations between the Ministry of Food and the Association of British and Irish Millers, Ltd. They recommend a final Ordinary dividend of 10 per cent., making 15 per cent. for the year (unchanged).

* * *

Toffee Dividends

Restriction of basic raw materials and controls of various kinds probably account for the decline in earnings of John Mackintosh and Sons, the well-known toffee and confectionery manufacturers. The past year represents the first full trading period since the reconstruction in June, 1939, when the business of A. J. Caley and Son was acquired. The trading profit of £156,100 goes against £218,800, but is struck after providing an unstated sum for excess profits tax. Provision for income-tax takes a further £30,000, compared with £50,000 for taxation in the preceding year.

No change is made in the dividends at 10 per cent. on the Deferred Ordinary, and an additional 5 per cent., making 15 per cent., on the Participating Preferred Ordinary shares, and the carry forward is larger at £138,200, against £105,500. Current assets are nearly £100,000 lower at £933,700, an increase in stocks being offset by reductions in debtors and sums due from subsidiaries, but a lower figure for creditors leaves a substantial net liquid surplus. A new holding of £70,000 in Government securities appears.

SCRIBBANS & CO., LTD.

IMPROVED RESULTS

The Fourteenth Annual General Meeting of Scribbans and Company, Ltd., was held on July 24 in London.

Mr. Philip E. Hill, Chairman of the Company, who presided, said:

The profit for the year, including dividends received, and after allowing for taxation and deferred repairs, amounts to £115,370, which is comparable with £91,602 last year—an increase of some £23,000 odd.

Care has been taken to provide proper depreciation of our buildings, plant, and machinery, and, as far as it is possible, to maintain them in good condition. All the company's subsidiaries show improving profits.

TOTAL RESERVES EXCEED £364,000.

Our cash at bank and in hand now stands at £103,453, which compares with an overdraft of £91,770 last year. We are again transferring the sum of £50,000 to general reserve, thus increasing this reserve to £150,000, and carrying forward the sum of £64,000 odd, so that our total reserves, including the carry forward, and after providing for the payment of the dividend now to be declared, amount to £364,849.

The year under review has, of course, seen exceptional difficulties. We buy from most parts of the Empire, and supplies are drawn from many world markets, and it has been our misfortune to see one market after another closed against us. This, in addition to the severe rationing of the main ingredients which are used to produce our goods, has made it difficult to satisfy the increasing demand by the public.

It is regretted that with regard to both cake and biscuits we have had to ration our customers, but every effort has been made to do this on an equitable basis, and we think our customers realise that, although supplies are short, they are being dealt with fairly and with courtesy, and we look forward to the time when we can again meet their every demand.

Your factories are, of course, doing their full share in the supply of goods to H.M. Forces and other priority demands. Although our premises have not entirely escaped from enemy action, there is no serious damage to report and fortunately no loss of life.

CURRENT YEAR'S TRADING CONDITIONS.

Trading conditions so far show an upward tendency over those of last year, but I am sure you will not expect me to attempt to forecast future results. A large number of our employees are serving with H.M. Forces, and it is to be regretted that a few casualties have occurred. We wish to take this opportunity of expressing our sympathies to those bereaved and to send our good wishes and hope for a speedy and safe return to the rest.

I should also like to take this opportunity of paying a tribute to the personnel and staff of all ranks for their services during the year, and am confident that we can look forward to a continuance of their efforts and loyalty in the future.

The Chairman concluded by moving the adoption of the report and accounts.

The report was unanimously adopted.

INFORMATION AND ADVICE

Coffee Essence—Cracking in Tomato Sauce—Information Supplied—Information Required

Coffee Essence

7,286. *I remember seeing some time ago articles on the manufacture of coffee essence. Is it possible for you to supply copies of the article in question? If so, will you please do so; if not, any information you can give will be greatly appreciated.* (London.)

There was an article in the July issue (1932) of FOOD MANUFACTURE which should be useful to you.

Unfortunately, the copy is out of print, but we could obtain photostat copies, which would cost you about 4s. each.

The manufacture of coffee essence is being kept rather a strict trade secret, but, so far as we can ascertain, it is probable that the article in question would keep you on the right track.

You might experiment with the following recipe, which we also published some years ago:

Firstly, consult a coffee blender for the coffee blend, and use it freshly roasted and ground. If addition of chicory is desired, use about 50/50 of coffee and the chicory. If the water is hard, then add 1 oz. carbonate soda to 24 gallons of water used. Take 64 lb. ground coffee, 28 gallons water, 56 lb. loaf or crystal sugar, 8¾ lb. caramel sugar.

Mix the coffee with 14 gallons of the water (boiling), cover, and keep warm for about two hours, strain, press, and stand aside. Reinfuse "grounds" in the remaining 14 gallons of water (boiling) for one hour, then press and strain. Next evaporate this second brew so that when mixed with the first liquor, stood aside, the two produce 10½ gallons. In this dissolve the caramel. If desired, add 1 pint (20 fl. oz.) of strong Jamaica rum to each 7½ gallons of the finished coffee essence. It will preserve and add to the cherishing effect of the coffee. Some makers add rum essence instead of the rum (quantity according to strength of rum essence). Salt is an optional addition, and is said to round off the flavour; it also acts as a preservative, as does the Jamaica rum. Fill into bottles while hot or warm, and as a precaution sterilise in the usual manner.

Cracking in Tomato Sauce

7,165. *We have been manufacturing sauce for several years, but cannot overcome the cracking in the article. We have experimented with pectins, gums, etc., but have not had any success, so are forwarding our method of manufacture, hoping you will be able to help us. In the fruit season we buy approximately 6,000 cases of tomatoes, and our plant will not allow us to make them straight into sauce, so we crush same and cook in jacketed pans till about half its volume and seal down in 4-gallon tins. When we are ready for manufacturing sauce we tip pulp into a 500-gallon container, stir well and take specific gravity reading (usually about 1·031). We then put pulp through a screen (size of holes approximately ⅜ in.) to remove seed and skins, and through another screen the same size to be sure of having taken all the particles out. We then pump into jacketed coppers to make boilings of 38 gallons. For a tomato sauce pulp reading 1·031—47 gallons—we add 1 gallon of water—48 gallons—and boil down to 38 gallons to finish. We add one bag of sugar and 10 lb. salt before starting to boil, and, when we have boiled down to 40 gallons, add ½ gallon 60 per cent. acetic acid and spices. It is then boiled to 38 gallons and run direct from copper to vacuum-filling machine and bottled into warm bottles to avoid breaking same. The sauce is then packed into cases and stacked until cold, then labelled and cased. The crack appears sometimes within two hours, and sometimes it takes days, but 90 per cent. develop the crack. We have the same trouble when making a chutney sauce, where the same method is employed. We have tried cooling straight off, packing loose, adding gums, sterilising, but still seem to get trouble.*

According to our information, the method of putting down tomatoes is all right, although it is preferable to pulp and sieve as soon as cooked and put at once into tins while hot. By doing this it is only necessary to pass again through the final sieve before putting into hot bottles, and a better result is obtained. The sauce is too much like jam, and, instead of adding 1 gallon of water, 5 gallons should be used and a proportional extra quantity of acetic acid added. For thickening, the use of Schisa gum is suggested. Put 12 oz. in the extra water and let stand four hours, stirring at intervals; the water should be cold. Proceed with the boiling of the sauce, and just before turning off the steam stir in the 2 gallons of gum solution, and as soon as this is done turn off the steam and put through sieving machine into the vacuum filler. This should settle the trouble both in the tomato and the chutney sauces. The quantity of Schisa gum is only a suggestion; it may require more or less, but by trying a small lot this could be ascertained. Twelve ounces has been used for the same quantity with perfect results.

Information Supplied

7,178. *We should be glad if you could let us have details of the method of manufacture of dried eggs similar to Cook's Farm Eggs, which are assumed to be roller-dried eggs. Also names of manufacturers of the most suitable plant for drying, packaging, etc., of dried eggs.* (London.)

Names of firms dealing with the equipment and packing were given.

7,184. *We are interested in the manufacture of tomato pulp and purée and shall be glad if you will give us the necessary information leading to the successful carrying out of this business.* (Nigeria.)

As this is too long and complicated for reply in this section, we referred our enquirer to an article on the subject published in FOOD MANUFACTURE, 1937, page 116.

7,189. *In a recent issue you mentioned and illustrated some "waxed paper containers", and we should be glad if you would put us in touch with the makers. We should also like to have a recipe for preparing blackcurrant concentrate from the fresh fruit, and also the best method of storage for subsequent use.* (Cork.)

Names of firms supplying waxed paper containers were given, and also the name of an expert to approach regarding blackcurrant concentrate.

7,191. *Would you please let us have the names of manufacturers of electrically driven labelling machines, output required about 2,000 an hour?* (Dublin.)

This was done.

7,193. *We should be much obliged if you would be so good as to furnish us with the name and address of manufacturers of the following machinery and instrument: Machine for pea shelling, and aerometer, an instrument used to determine the concentration degree of tomato purée.* (Portugal.)

Names and address were given.

7,194. *We wish to secure machinery for the purpose of making small blocks of an extract, somewhat similar to Oxo, in cubes. We should be greatly obliged if you could advise us the names of any firms who specialise in this type of article.* (Liverpool.)

Names were given.

7,199. *We have been asked to supply a new machine capable of grinding bones (all fat having been extracted by steam) into bonemeal. The quantity would be approximately 2 or 3 tons daily. We should esteem it a favour if you could give us the name of any firm making such a machine.* (London.)

This was done.

Information Required

7,635. *We should be obliged if you could give us any information regarding brewer's dried yeast, as we have a quantity of this for disposal.* (Leeds.)

RECENT PATENTS

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Abstracts of Recent Specifications

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume, or in bound volumes price 2s. each.

Improvements in or Relating to the Manufacture of Glucose from Potatoes

The principal object of the invention is to provide a simplified and improved process for the manufacture of glucose from potatoes which not only effects considerable economy of operation but also gives an increased over-all yield and a more valuable by-product,

The glucose is made from the potatoes without first going through the process of producing a refined potato starch. That is to say, the potatoes are pulped and subjected to certain preliminary operations to remove coarse fibre and soluble impurities and are then, while still containing a considerable amount of fine pulp, subjected to the converting operation.

Following a preliminary washing operation, the potatoes are given a more thorough washing operation to remove the dirt and impurities usually retained in the uneven surfaces and eyes of the potatoes. For this purpose use is made of the known type of washing or scrubbing apparatus which consists of a cylindrical reel covered with 8 mm. perforated metal and equipped on the interior with brushes in the form of an Archimedean screw. Where warm water is available, for example from glucose evaporators, further advantage can be gained by washing in the above described type of washing apparatus in warm water up to 50° C.

The washed and scrubbed potatoes are then ground to a pulp in the well known manner.

The potato pulp is then treated to remove unground portions of the potatoes or large portions of pulp, for example, by passing the pulp over a sieve of any suitable construction. A cylindrical reel covered with perforated metal with 8 mm. openings may be employed to advantage for this purpose.

The resulting material free from unground portions of potato or large portions of pulp, is diluted with water, preferably about 30 per cent. based on the pulp potato volume, and introduced into a centrifugal machine to remove albuminous matter, such as soluble protein and inorganic matter, such as soluble ash, soluble salts, etc. (fruit water). Either a continuous or batch type centrifuge may be employed, but the type generally used for this purpose is the continuous horizontal drum type which discharges starch at 19° to 20° Baumé and delivers overflow containing both solubles and small amounts of fine pulp.

The pulp flowing as underflow from the centrifuging operation is then subjected to a sieving operation, using a cylindrical or shaking sieve (about ·6 to 1 mm. mesh), to remove the coarse fibre. Preferably fresh water is added to the pulp before the sieving operation to give the pulp a density of 5° to 6° Baumé. To remove coarse fibre, it may, if desired, be subjected to further sieving operations.

The mixture of starch and fine pulp is then preferably subjected to a further separating operation, either by centrifuging or filtering, to further reduce the soluble content of the mixture.

The mixture of starch and pulp thus obtained is sufficiently free from impurities for conversion to glucose but is first diluted to the desired density for conversion (22° to 24° Baumé) by the addition of 38 to 50 per cent. by weight of fresh water.

The diluted mixture is then converted to glucose, following the well-known procedures, and after conversion, the converted glucose solution (still containing a considerable amount of fine pulp) is subjected to the usual filtering operation which separates the refined glucose from the fibrous material.

This fibrous material, having been cooked in the converter, is of more value as a by-product (*e.g.*, cattle food) for the reason that the starch particles embedded in the fine fibre (and not readily removable by ordinary separating processes) has been converted to glucose and, furthermore, the fine pulp itself has been partially hydrolyzed to a more digestible form.

536,020. Corn Products Company Limited.

Latest Patent Applications

4024. BOEHM, LTD., F., and KUNZER, H.: Preparation of preserved egg products.
4247. PROCTOR, J. W.: Device for cutting, etc., vegetables.
4399. FRASER, J. P.: Synthesis of saccharin.
4643. JANSER, A.: Colloidal vegetable products.
4726. LEHMANN, H. L., and SONDHEIMER, M.: Method for utilisation of food waste.
4561. WARBURTON, C. H.: Production of syrup.
5420. CARTER, T. S., KULKA, D., and GASKING, E. H.: Manufacture of vitamin-containing material.
5663. CHARLEY, V. L. S., HOPKINS, D. P., and POLLARD, A.: Method of treating fruit juices.
5399. THORNTON, A. A. (CREAMERY PACKAGE MANUFACTURING CO.): Method of homogenising liquids.
6207. WEST OF SCOTLAND AGRICULTURAL COLLEGE, SMILLIE, D. M., and WIGHT, J.: Preparation of edible milk-like products.

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

536,020. CORN PRODUCTS CO., LTD., and WASCHER, H. G.: Manufacture of glucose from potatoes.
536,023. WESTINGHOUSE ELECTRIC INTERNATIONAL CO.: Food-preserving apparatus for use in refrigerating chambers.
536,027. CORN PRODUCTS REFINING CO.: Production of zein.
536,306. GAVIN, P. J.: Machine for steaming and cubing, and drying and mixing foodstuffs for livestock.
537,136. POWELL, G. F., and LEYSHON, F. W. J.: Material for cleaning tinplates.
537,139. ROSE, A. G., and ROSE BROS. (GAINSBOROUGH), LTD.: Feeding of bread to slicing machines.

TRADE MARKS

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

DULSAC.—613,320. Sweetening materials, being articles of food. **Genatosan, Ltd.**, 43, Regent Street, Loughborough, Leicestershire; Manufacturing Chemists.

SYRAMOL.—613,370. Syrups principally of sugar and glucose and golden syrup. Ernest Marshall, trading as **Copper Kettle Preserves**, Chester Walk, Cheltenham Spa, Gloucestershire; Manufacturer.

JABISCO.—613,392. Biscuits (other than biscuits for animals), shortbread and cakes. **W. and R. Jacob and Co. (Liverpool), Ltd.**, The Aintree Biscuit Factory, Aintree, Liverpool, 9; Biscuit Manufacturers. (By Consent.)

JOAN OF ARC.—613,757. Canned vegetables, canned baked beans and canned soups. Schuckl and Company Incorporated, 260, California Street, San Francisco, U.S.A.; Canners and Exporters. Address for Service is c/o **Reginal W. Barker and Co.**, Vulcan House, 56, Ludgate Hill, London, E.C. 4. To be Associated with No. 398,606 (2192) xlii and others.

OVALTINE.—613,191. All goods included in Class 30, but not including food preparations (not medicated) in powder or tablet form composed principally of malt, milk and eggs, the malt predominating. **A. Wander, Ltd.**, 184, Queen's Gate, London, S.W. 7; Manufacturing Chemists. To be Associated with No. 280,982 (1472) xlii and others.

JOAN OF ARC.—613,758. Canned tomato juice, being a non-alcoholic beverage. Schuckl and Company Incorporated, 260, California Street, San Francisco, U.S.A.; Canners and Exporters. Address for Service is c/o **Reginald W. Barker and Co.**, Vulcan House, 56, Ludgate Hill, London, E.C. 4. To be Associated with No. 398,606 (2192) xlii and others.

NEW COMPANIES

H. W. Bruton and Sons, Limited. (365057.) 60-62, Holmesdale Street, Grangetown, Cardiff. To take over bus. of Harry W. Bruton, Thos. H. Bruton and John M. Bruton; to carry on bus. of mnfrs. of and dlrs. in confectionery, foodstuffs, etc. Nom. cap.: £2,000 in £1 shares. Dirs.: H. W. Bruton, 62, Holmesdale Street, Cardiff; T. H. Bruton, 6, Avondale Road, Cardiff; J. M. Bruton, 62, Holmesdale Street, Cardiff.

Charter-Bishop, Limited. (365842.) 8, Water Street, Manchester, 3. To carry on the bus. of mnfrs. of and dlrs. in ice-cream, custard and baking-powders, etc. Nom. cap.: £500 in £1 shares. Dirs.: Mrs. A. M. Briggs, 54, Park Lane, Whitefield, Lancs; Mrs. J. Holt, 18, Rudyard Road, Salford, 6, Lancs.; Mrs. E. Marsh, Wilworth Crescent, Ramsgreave, Blackburn, Lancs.

Colyat, Limited. (365221.) 49, King Street, Manchester. To carry on the bus. of dlrs. in merchandise of all kinds, including tea, provisions, silk, clothes, etc. Nom. cap.: £1,000 in £1 shares. Dirs.: H. Yates, Fairway, Broad Oak Park, Worsley, Manchester; W. Burgess, Beech Tree Bank, Prestwick, Manchester; and 3 others, addresses not stated.

Cream Biscuits, Limited. (365044.) 41, Ventnor Drive, Totteridge, Herts. Nom. cap.: £500 in 1s. shares. Dirs.: F. Marcantonio, 11A, Sebert Road, E. 7; M. Matlow, 41, Ventnor Drive, Totteridge, Herts.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.